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Manpower Status of the U.S.-Flag Oceangoing Merchant Marine:

An Interim Report

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MANPOWER STATUS OF THE
U. S.-FLAG OCEANGOING MERCHANT MARINE:
AN INTERIM REPORT

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The National Academy of Sciences
by the
SHIPBOARD MECHANIZATION AND MANPOWER COMMITTEE

Maritime Transportation Research Board
Division of Engineering
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This study, prepared by the Shipboard Mechanization and Manpower Committee of the Maritime Transportation Research Board for the National Academy of Sciences, is submitted to the Office of Naval Research, Department of the Navy, under provisions of Contract Nonr-2300(23), between The National Academy of Sciences and the Office of Naval Research.

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FOREWORD

At the 11 January 1966 meeting of the Maritime Transportation Research Board (MTRB), a representative of the Commander, Military Sea Transportation Service (MSTS) expressed the concern of MSTS in developing information on the availability of seagoing manpower to meet emergency shipping requirements. This concern was repeated in a letter to the MTRB from the Commander, MSTS on 19 January 1966. This letter urged that the MTRB undertake a study of "the availability of manpower to meet increased Department of Defense shipping requirements," stating that "... effective planning for the future cannot take place without greatly increased knowledge on this subject. "

Following a request made through the Office of Naval Research (ONR), the National Academy of Sciences accepted this project and assigned it to the MTRB. At the 27 April meeting of the Shipboard Mechanization and Manpower Committee (a committee of the Board) Admiral Callaghan, Chairman of the MTRB, officially requested that the Committee, with the assistance of its professional staff, undertake the project as proposed by MSTS.

The ONR letter to the Academy outlined the project as follows:

"This proposed research is to be aimed at the potential capability of the merchant marine in terms of shipping that can be activated, manned, and sailed within certain time frames to meet emergency situations. It is requested that the Maritime Transportation Research Board of the National Academy of Sciences consider the following tasks for high priority investigation:

1. to develop the best possible estimates of seagoing manpower potential from recent studies and other available data,
2. to immediately explore additional data sources and requirements for refining the initial estimates provided by item 1,
3. to develop more current and more detailed estimates of seagoing manpower potential, using the latest available manpower and crew size information, and

4. to develop a program with a view towards providing additional information and advice as may be required for the resolution of future maritime manpower problems."

This Interim Report is transmitted in completion of Item 1, above. It contains the best estimates of the requirements for and availability of seagoing personnel to man the current U. S. -flag oceangoing merchant marine that could be developed from recent studies and other available data. It includes both MSTS Civil Service-manned ships and privately operated ships.

Concurrently with the preparation of this report, additional sources of information were investigated which would permit more precise estimates of manpower requirements and availability (Item 2, above). The prospective program for the coming MTRB contract year includes the development of more current and more detailed estimates of seagoing manpower potential, using the latest available manpower and crew size information (Item 3), and maintaining a program for providing additional manpower information and advice to MSTS as may be required for the resolution of future maritime manpower problems (Item 4).

Henry W. Clark, Chairman
Shipboard Mechanization and
Manpower Committee
Maritime Transportation Research
Board

Washington, D. C.
June 21, 1966

CONTENTS

FOREWORD	vii
INTRODUCTION	1
CONCLUSIONS	3
ADDITIONAL DATA REQUIREMENTS	5
I. THE U. S. - FLAG OCEANGOING FLEET	7
II. MSTS MANPOWER REQUIREMENTS AND AVAILABILITY	9
III. MANPOWER REQUIREMENTS AND AVAILABILITY FOR PRIVATELY OPERATED OCEANGOING SHIPS	21
 <u>APPENDIXES:</u>	
A. THE PRIVATELY OPERATED FLEET	39
B. CATEGORY ASSIGNMENT TECHNIQUE	45
C. MSTS SHIPBOARD JOBS, MEN EMPLOYED, AND MEN-PER-JOB RATIOS	49
D. SHIPBOARD JOBS, MEN EMPLOYED, AND MEN-PER-JOB RATIOS FOR PRIVATELY OPERATED SHIPS	59
E. ATTRITION OF THE SEAGOING WORK FORCE MANNING PRIVATELY OPERATED SHIPS	75
F. MANPOWER REQUIREMENT ESTIMATES FOR PRIVATELY OPERATED SHIPS	81

FIGURES

1	Numbers of Oceangoing Ships Employing Engineering Officers	8
MSTS Manpower Requirements and Availability:		
2	Deck and Engineering Officers	11
3	Radio and Staff Officers	12
4	Unlicensed Deck Department Personnel	13
5	Unlicensed Engine Department Personnel	14
6	Steward's Department Personnel	15
Manpower Requirements and Availability for Privately Operated Oceangoing Ships:		
7	Deck Officers	25
8	Engineering Officers	26
9	Radio Officers	27
10	Staff Officers	28
11	Skilled Unlicensed Deck Department	29
12	Unskilled Unlicensed Deck Department	30
13	Skilled Unlicensed Engine Department	31
14	Unskilled Unlicensed Engine Department	32
15	Skilled Steward's Department	33
16	Unskilled Steward's Department	34
Net Attrition of Seagoing Work Force aboard Privately Operated Ships:		
E-1	Deck and Engineering Officers	77
E-2	Radio and Staff Officers	78
E-3	Unlicensed Deck and Engine Departments	79

TABLES

1	Manpower Requirement Ranges for All Oceangoing Ships, as of April 1966	16
2	Manpower Availability for All Oceangoing Ships, as of Mid - 1966	18
3	Manpower Shortage & Surplus Estimates at Various Attrition Rates for Privately Operated Oceangoing Ships, June 1966 - June 1967	35
4	Deck and Engineering Officers Holding Valid Unlimited Licenses, as of 31 March 1963, by Last Period of Employment under Articles	37
A-1	MarAd Tabulation of U. S. -Flag Oceangoing Ships, 1,000 Gross Tons and Over, as of 1 April 1966	41
A-2	<u>Shipboard Manpower</u> Tabulation of U. S. -Flag Ships Operating Regularly under Articles, 1 April 1962 - 31 March 1963	43
B-1	Job Categories, Showing Ranks and Ratings Included	47
MSTS Fleet:		
C-1	Jobs, as of April 1966	50
C-2	Jobs during 1962	52
C-3	Employment during 1962	54
C-4	Ratio of Men Per Job during 1962	55
C-5	Civilian Marine Personnel, as of 30 April 1966	56
C-6	Estimated Ratio of Men Per Job, as of 30 April 1966	57
Jobs aboard Privately Operated Ships of 1,000 Gross Tons and Over:		
D-1	As of 1 April 1966	61
D-2	As of 1 October 1961	63
D-3	Employment aboard Privately Operated Ships, 1 April 1962 - 31 March 1963	65
D-4	Ratio of Men Per Job aboard Privately Operated Oceangoing Ships, 1 April 1962 - 31 March 1963	68
D-5	Estimated Jobs aboard Privately Operated Oceangoing Ships, as of 1 April 1966	70
D-6	Manpower Availability Projection for Privately Operated Oceangoing Ships, as of 30 June 1966	72
E-1	Net Attrition of Seagoing Personnel Manning Privately Operated Ships, 31 December 1962 - 30 June 1966	80
F-1	Manpower Requirement Estimates (including Vacations, Port Relief, and Hospitalization) for Privately Operated Oceangoing Ships, as of 1 April 1966	82
F-2	Vacation Allowance Estimates for Privately Operated Oceangoing Ships, as of 1 April 1966	84
F-3	Port Relief and Hospitalization Allowance Estimates for Privately Operated Oceangoing Ships, as of 1 April 1966	86

INTRODUCTION

This report develops estimates of the requirements for and availability of seagoing personnel to man the U. S. -flag oceangoing merchant marine. Data are presented separately for the MSTS Civil Service-manned fleet and for privately operated oceangoing ships. Great Lakes ships are excluded.

For both segments of the fleet, the data are grouped into ten job categories:

- Deck Officers
- Engineering Officers
- Radio Officers
- Staff Officers
- Unlicensed Deck Department, Skilled
- Unlicensed Deck Department, Unskilled
- Unlicensed Engine Department, Skilled
- Unlicensed Engine Department, Unskilled
- Steward's Department, Skilled
- Steward's Department, Unskilled (including Concessionaires)

Medical and Nuclear jobs and personnel are excluded.

All data whose sources are not otherwise cited are taken from, or computed from data in, Shipboard Manpower.¹ That report contains comprehensive information on employment, union and union-management affiliation, age, length of service, attrition, and qualifications of seagoing personnel who worked under articles during the Study Year, 1 April 1962 - 31 March 1963; and information on employment, age, length of service, and qualifications of Civilian Marine Personnel employed by MSTS during calendar 1962. Information sources included Coast Guard records ("Certificate of Discharge" and "Record of Entry in Continuous Discharge Book" forms, "Merchant Seaman's File" jackets, and license files), MSTS personnel and employment records, and a questionnaire survey of the membership of the International Organization of Masters, Mates and Pilots, AFL-CIO.

¹ Maritime Transportation Research Board, National Academy of Sciences - National Research Council (NAS-NRC), Shipboard Manpower, NAS-NRC Report 1410, Washington, 1966 (2 volumes; in press). The first volume was published on June 23, 1966. Publication of the second volume, which contains the appendixes, is expected in August 1966.

CONCLUSIONS

These conclusions are based upon the estimated numbers of jobs aboard MSTs and privately operated ships during April 1966. To the extent that the numbers of shipboard jobs increase during the coming year, the conclusions underestimate the anticipated manpower shortages.

1) MSTs Civilian Marine Personnel

Assuming that the present attrition rate for MSTs seagoing personnel in each of the 10 job categories is the same as during 1959-1962, the data indicate shortages during the coming year in all 10 categories. The anticipated shortages range from 13 to 294 men, exceeding 100 in 5 categories and exceeding 200 in 3 categories.

2) Personnel Manning Privately Operated Oceangoing Ships

Assuming an average annual net attrition rate of 4 per cent from the end of 1962 through mid-1967, the data indicate shortages during the coming year in all 10 categories. The anticipated shortages range from 242 to 1,818 men in the four Officer categories and from 367 to 1,976 men in the six Unlicensed categories. Even at an average annual net attrition rate of 2 per cent over that period, shortages ranging from 97 to 900 men would occur in all four Officer categories. At the 2-per-cent level, however, all six Unlicensed categories show surpluses ranging from 350 to 1,497 men.

ADDITIONAL DATA REQUIREMENTS

Like most estimates, the estimates developed in this report can be improved. Data from three main additional sources can provide the basis for more accurate and more detailed estimates of manpower requirements and availability. These sources were known to exist at the start of this project but, in each case, the time and manpower required to obtain, process, and analyze the data precluded its use in this Interim Report. The need for, nature, and sources of the additional data are summarized below, in descending order of their estimated importance to the overall accuracy of the Final Report.

Manpower Available for Privately Operated Ships

For each job category, the number of seagoing personnel available to man privately operated oceangoing ships (Table 2, column 4) is projected from the observed net attrition of the seagoing work force during 1959-1962 (Appendix E). The projections assume that the average annual net attrition rates for 1959-1962 have remained constant since that time. More accurate attrition information can be developed by directly comparing each year's work force size and composition with those for the preceding year, rather than by projection. As noted in Appendix E, the necessary information for such comparisons is now available from the Maritime Administration. Its use will permit a more accurate estimate of the number of trained men available in each job category and, within each job category, a breakdown by individual rank and rating and by union-management group.

Jobs aboard Privately Operated Ships

For each job category, the estimate of the number of current jobs aboard privately operated oceangoing ships (Table 1, column 3) is derived from typical manning scale data for each ship type (shown in Table A-1). Ship-by-ship manning scales can be obtained from the Coast Guard files of Shipping Articles. This will permit a more accurate count of the jobs in each category and, within each job category, a breakdown of current jobs by individual rank and rating and by union-management group.

MSTS Manpower Available

The estimates of the numbers of Civilian Marine Personnel available by job category (Table 2, column 4) are based upon a single total figure and assume that the current percentage distribution of these personnel among the 10 job categories is the same as during 1962. Information on the exact number of MSTS seagoing personnel in each job category, which can be obtained from the MSTS Area Commands, will permit a more accurate comparison of manpower availability with requirements.

CHAPTER I

THE U. S. - FLAG OCEANGOING FLEET

The size of the U. S. -flag oceangoing merchant marine is shown in Figure 1, which excludes Great Lakes ships. The left-hand bar depicts the fleet active during the Study Year (1962-63) covered by the Shipboard Manpower data; the right-hand bar represents the active fleet, as of April 1966. In this graph, fleet size is based upon the number of ships that employed Engineering Officers during the Study Year; three fewer ships employed Deck Officers during the same period.

The top (diagonally shaded) segment of each bar shows the number of MSTS Civil Service-manned ships. The other two segments represent privately operated oceangoing ships which sail regularly under articles, including ships operated privately for MSTS under General Agency Agreement.² The large (unshaded) segment at the bottom of each bar indicates the number of privately operated ships included in the Maritime Administration (MarAd) tabulations of "U. S. Flag Oceangoing Ships of 1,000 Gross Tons and Over".

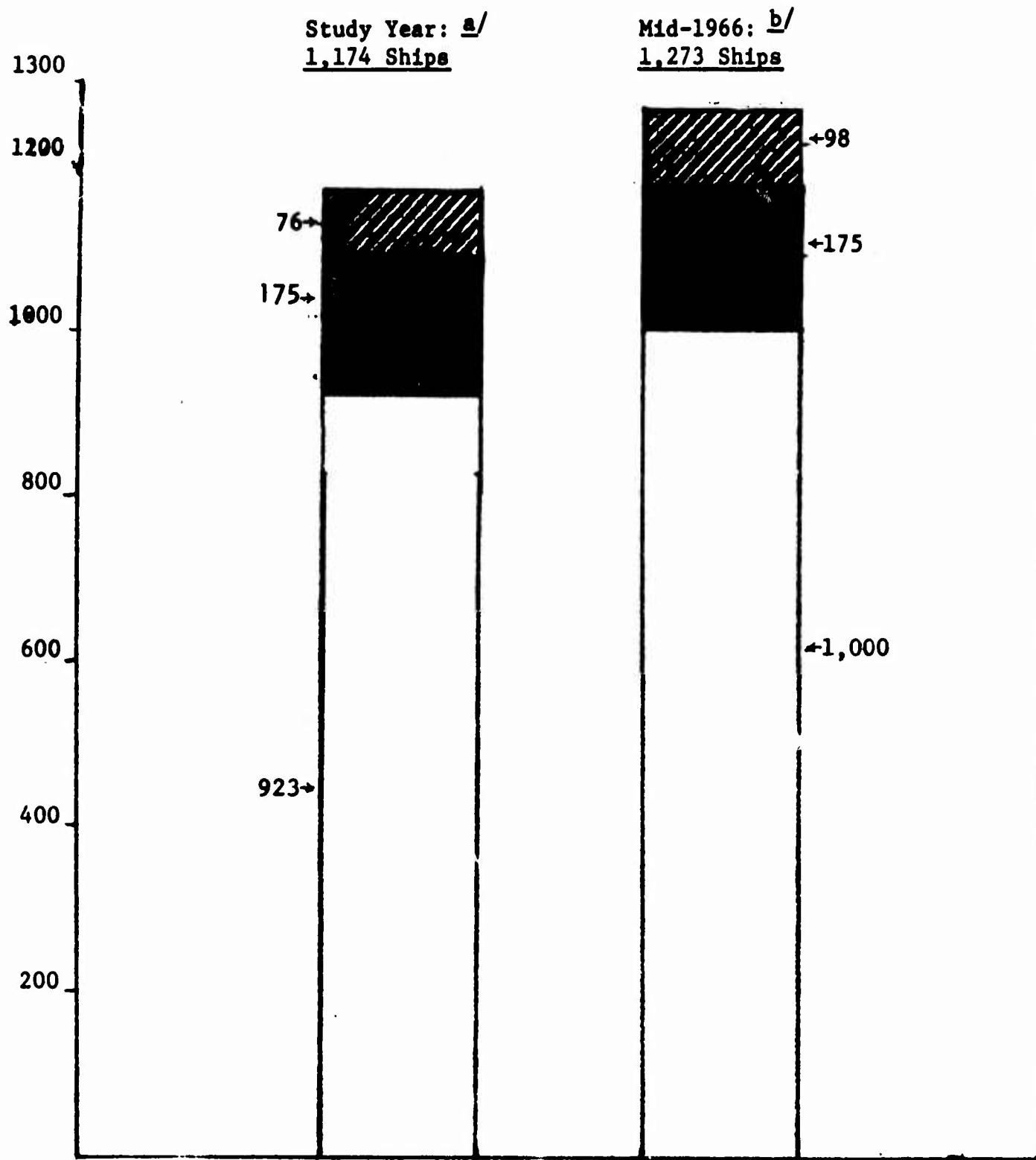
The middle (vertically shaded) portion of each bar represents the 175 ships that sailed regularly under articles during the Study Year but fall within the several categories which are excluded from the MarAd tabulation. For purposes of estimating the manning requirements of the current fleet, it is assumed that these same 175 ships are still operating regularly under articles with the same average crew sizes as during the Study Year for which detailed data were compiled on their operations.

The differences in the criteria for inclusion in the MarAd and Shipboard Manpower tabulations are described in Appendix A. This appendix also includes the 1 April 1966 MarAd tabulation, showing the numbers of each ship type included, and the Shipboard Manpower tabulation, showing the different numbers of ships employing men in each of the officer categories and the overall unlicensed personnel category.


² In Shipboard Manpower, the privately operated portion of the merchant marine is termed "Commercial".

FIGURE 1.

NUMBERS OF OCEANGOING SHIPS EMPLOYING ENGINEERING OFFICERS



 - MSTs Civil Service-manned ships.

 - Privately operated ships not included in MarAd tabulation.

 - Privately operated ships included in MarAd tabulation.

a/ Study Year for MSTs data is 1962; for privately operated ships, 1 April 1962-31 March 1963.

b/ For MSTs ships, 30 April ; for other ships, 1 April 1966.

CHAPTER II

MSTS MANPOWER REQUIREMENTS AND AVAILABILITY

Estimates of the current manning requirements and seagoing personnel available for the MSTS Civil Service-manned fleet of 98 ships are summarized by job category, as of 30 April 1966, in a series of bar graphs (Figures 2 through 6) and in Tables 1 and 2. These estimates are based upon information developed by the MTRB staff under the direction of the Shipboard Mechanization and Manpower Committee during its study of maritime manpower. (See Appendixes B and C.)

Assuming that the present attrition rate for MSTS seagoing personnel in each of the 10 job categories is the same as during 1962, the data indicate shortages during the coming year in all 10 categories. The anticipated shortages range from 13 to 294 men, exceeding 100 in 5 categories and exceeding 200 in 3 categories.

Taking the Deck Officer category as an example (Figure 2), the height of Bar 1 indicates that there are 610 men available³ to fill the 492 shipboard jobs⁴ represented by the height of Bar 2. Each tic mark on Bar 3 indicates the number of men required to fill these 492 Deck Officer jobs at the specified men-per-job ratio. (This is shown for the range from 1.0 to 2.0 men per job.) To the right of each ratio, the parenthesized number of days is the average annual employment per man that would be required to fill these 492 jobs, assuming that the average shipboard job is manned 350 days per year.

The shaded area on Bar 3 shows the estimated manpower requirement range. The lower limit of this range corresponds to a ratio of 1.17 men per job,⁵ based upon the MSTS Replacement Reserve of 17 per cent. This allowance covers personal leave, port relief requirements, and hospitalization. At a men-per-job ratio of 1.17, the manpower requirement would be 576 men.⁶ If each of the 492 jobs were filled for an average of 350 days during the year, these 576 Deck Officers would have to average 299 days of shipboard employment (including work as Port Relief Officers) during the year. With 610 men available, there would be a surplus of 34. (If all 610 men were employed, the average annual employment required to fill the same 492 jobs for an average of 350 days would drop from 299 to about 282 days per man.) So far, however, no allowance has been added to permit the replacement of men lost through normal attrition.

³ From Table 2, line 1, column 4.

⁴ From Table 1, line 1, column 3.

⁵ From Table 1, line 1, column 5.

⁶ From Table 1, line 1, column 7.

The upper limit of the (shaded) estimated manpower requirement range corresponds to a ratio of 1.34 men per job.⁷ This is the actual ratio between the total number of MSTS Deck Officers estimated and the number of MSTS Deck Officer jobs filled during the Shipboard Manpower Study Year, calendar 1962. Applying this 1962 men-per-job ratio to the 492 current Deck Officer jobs, the manpower requirement becomes 659 men.⁸ If each job were filled for an average of 350 days during the year, these 659 men would have to average 263 days of employment, including port relief, during the year. With only 610 men available, it would be necessary to add 49 Deck Officers to the MSTS seagoing work force during the course of the year to meet the expected manpower requirement, including attrition.

It should be emphasized that the lower limit of the estimated manpower requirement range includes no allowance for attrition; it can be used only to estimate whether a shortage now exists or is likely in the immediate future. Comparing the number of men (Bar 1) with the lower limit of the estimated manpower requirement range (the bottom of the shaded area, Bar 3) for each job category (Figures 2 through 6), the data indicate such short-term shortages in 6 of the 10 job categories.

Since the upper limit shown on each of these graphs corresponds to the 1962 men-per-job ratio, it includes attrition. Because the upper limit of the requirement range does include attrition, it can be used to indicate whether a shortage is likely within the coming year and to estimate how many men should be added to the work force to avert a shortage. If the present attrition rate is the same as during 1962, the upper limit of the estimated manpower requirement range provides a reasonably good estimate of the actual number of men required to man the current fleet during the coming year. On this basis, comparing the number of men available (Bar 1) with the upper limit of the estimated requirement range (the top of the shaded area, Bar 3), the data indicate shortages during the coming year in all 10 job categories. These shortages range from 13 to 294 men, exceeding 100 in 5 categories and exceeding 200 in 3 categories.⁹

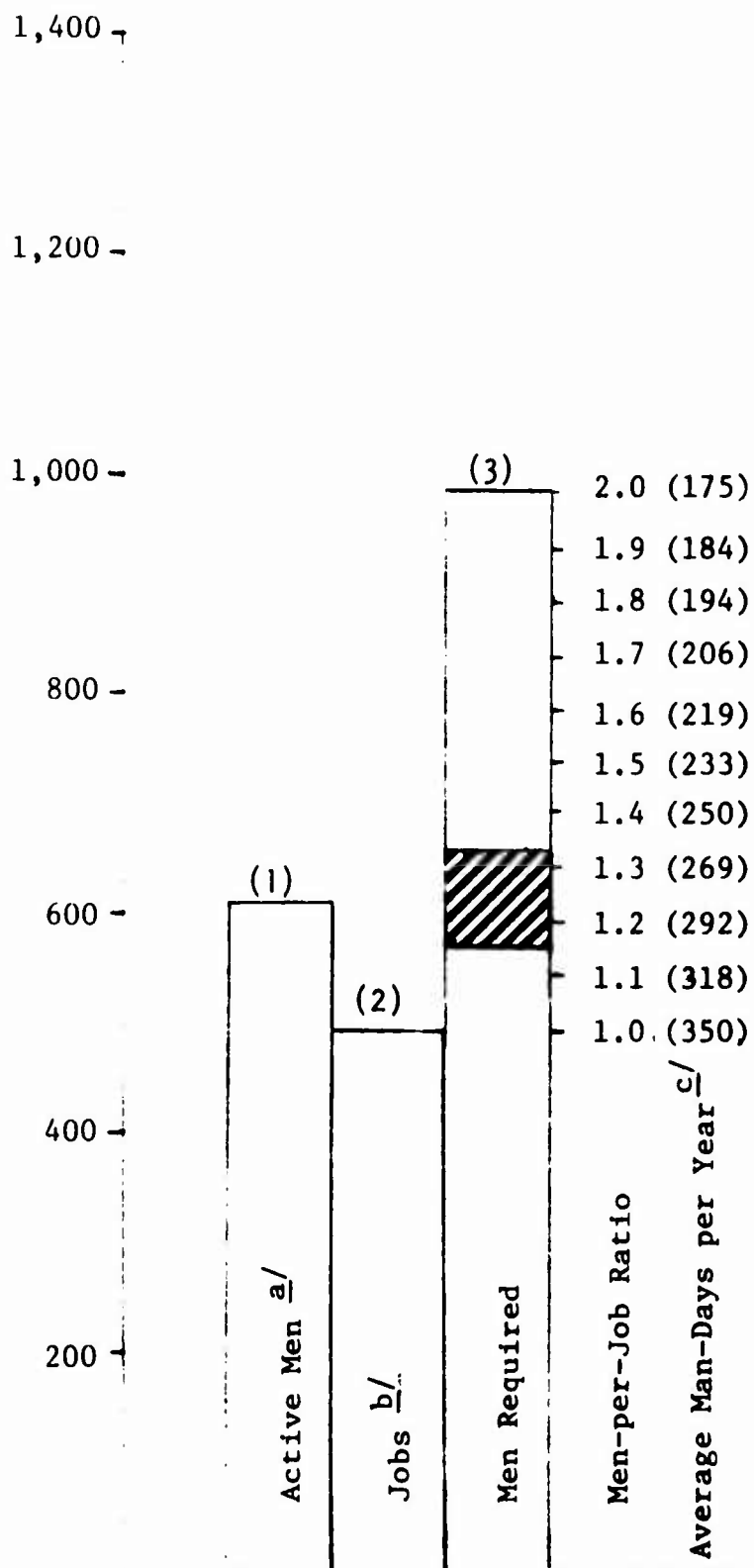
⁷ From Table 1, line 1, column 4.

⁸ From Table 1, line 1, column 6.

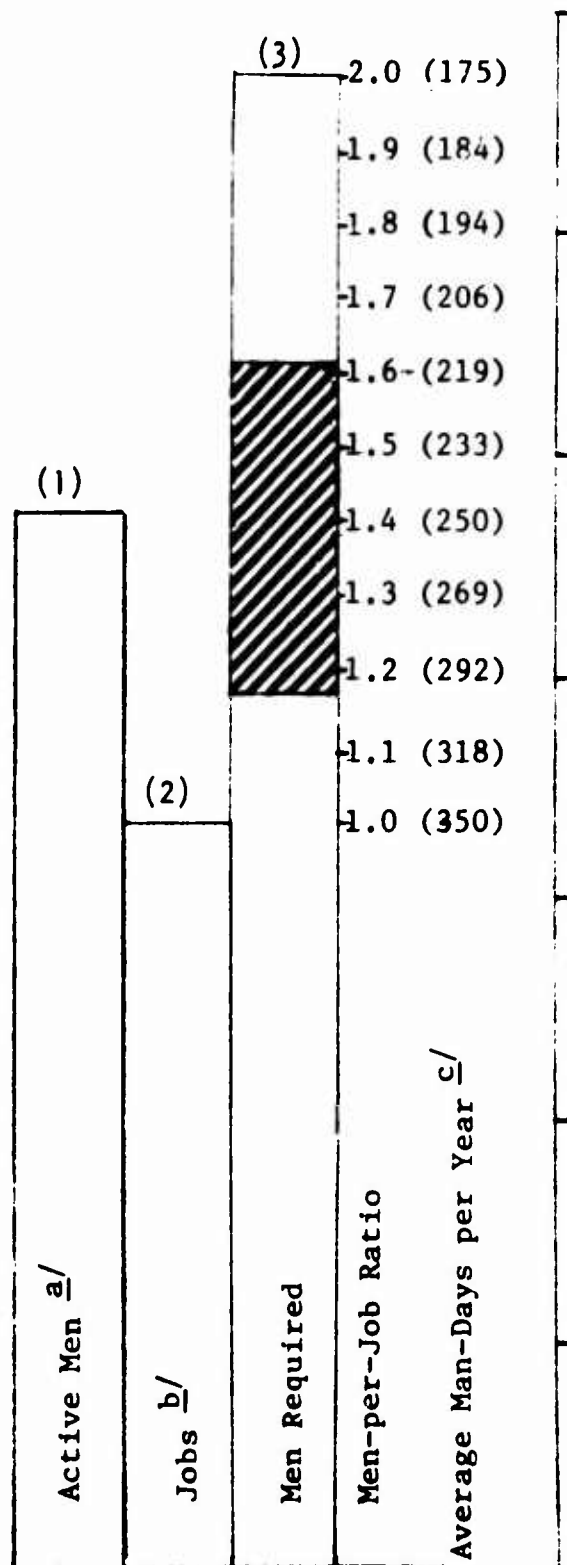
⁹ Table 1, column 6, minus Table 2, column 2.

MSTS DECK AND ENGINEERING OFFICER
REQUIREMENTS AND AVAILABILITY
AS OF 30 APRIL 1966


Deck Officers



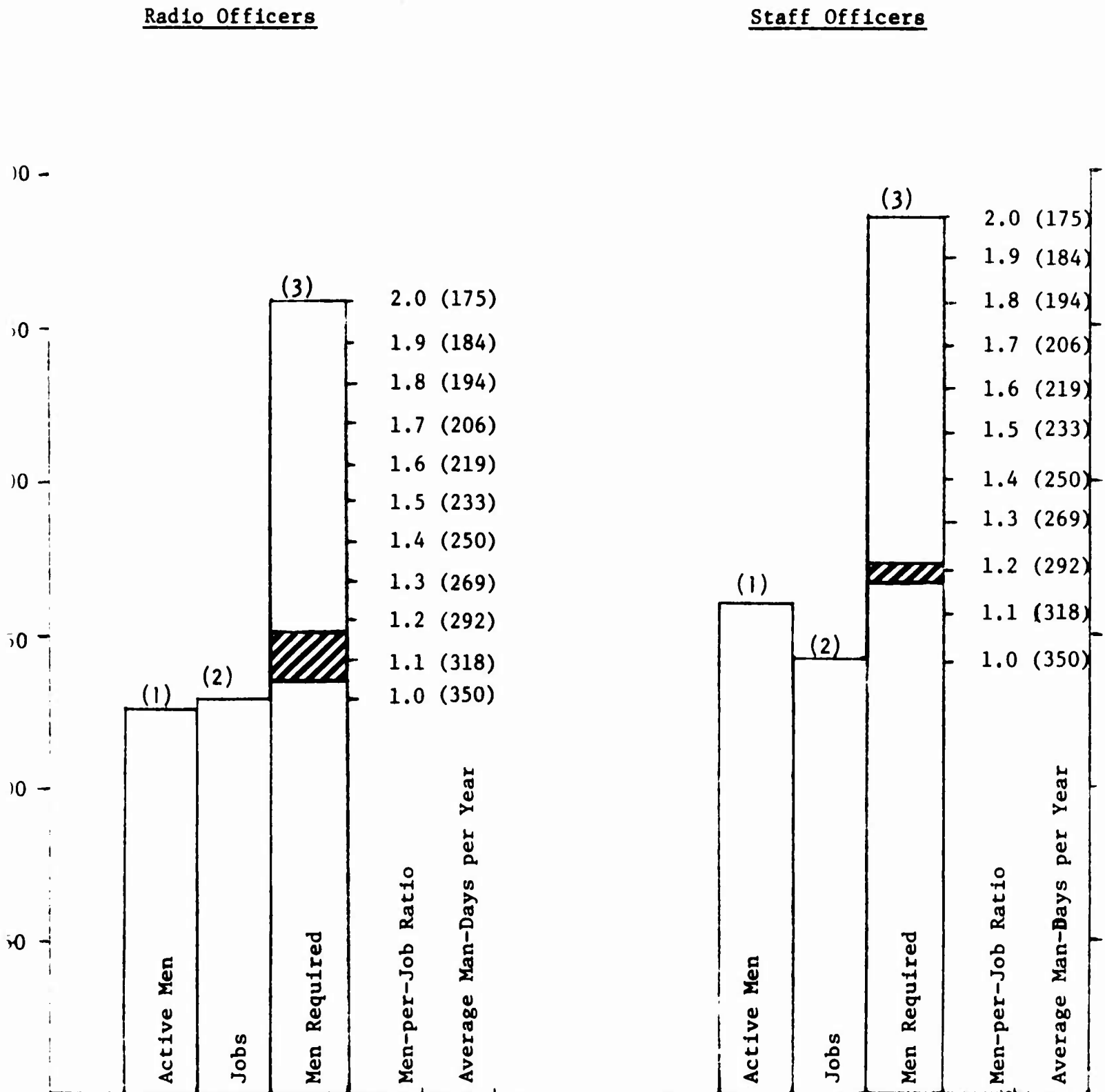
Engineering Officers



- a/ Includes Port Relief men.
b/ Includes Port Relief jobs.
c/ Man-days include Port Relief.

 Estimated Manpower Requirement Range

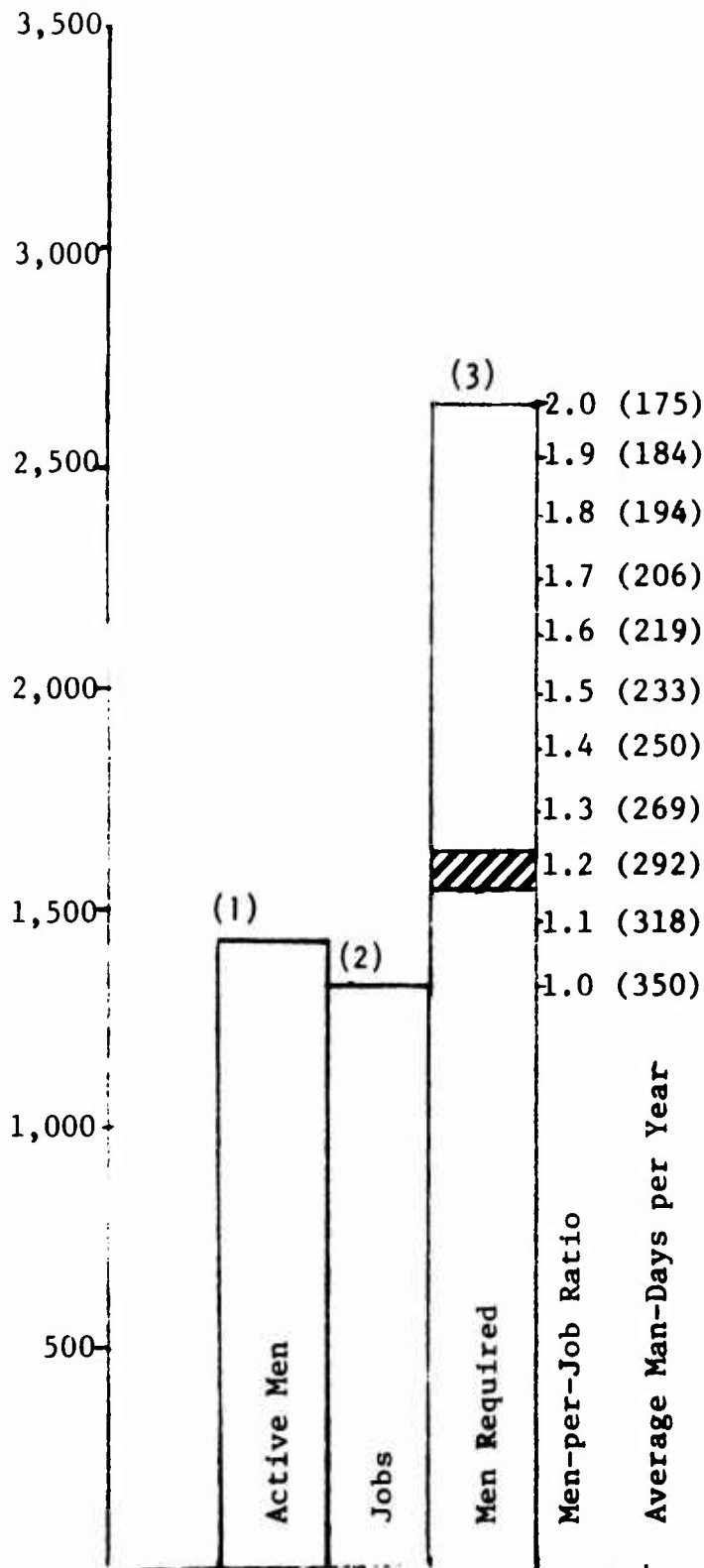
**MSTS RADIO AND STAFF OFFICER
REQUIREMENTS AND AVAILABILITY
AS OF 30 APRIL 1966**



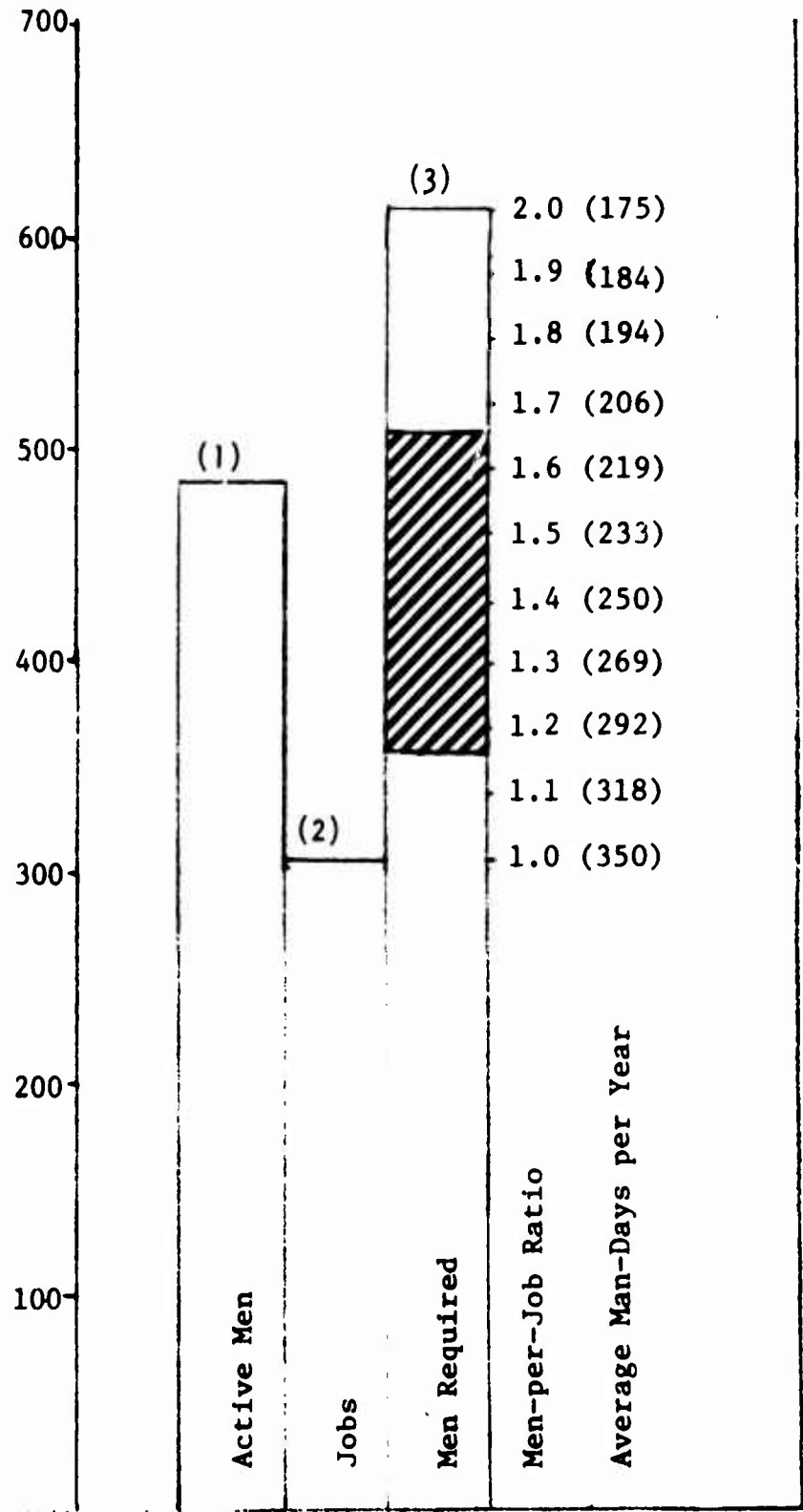
 Estimated Manpower Requirement Range.

MSTS UNLICENSED DECK DEPARTMENT PERSONNEL
REQUIREMENTS AND AVAILABILITY
AS OF 30 APRIL 1966

Skilled Deck Department



Unskilled Deck Department

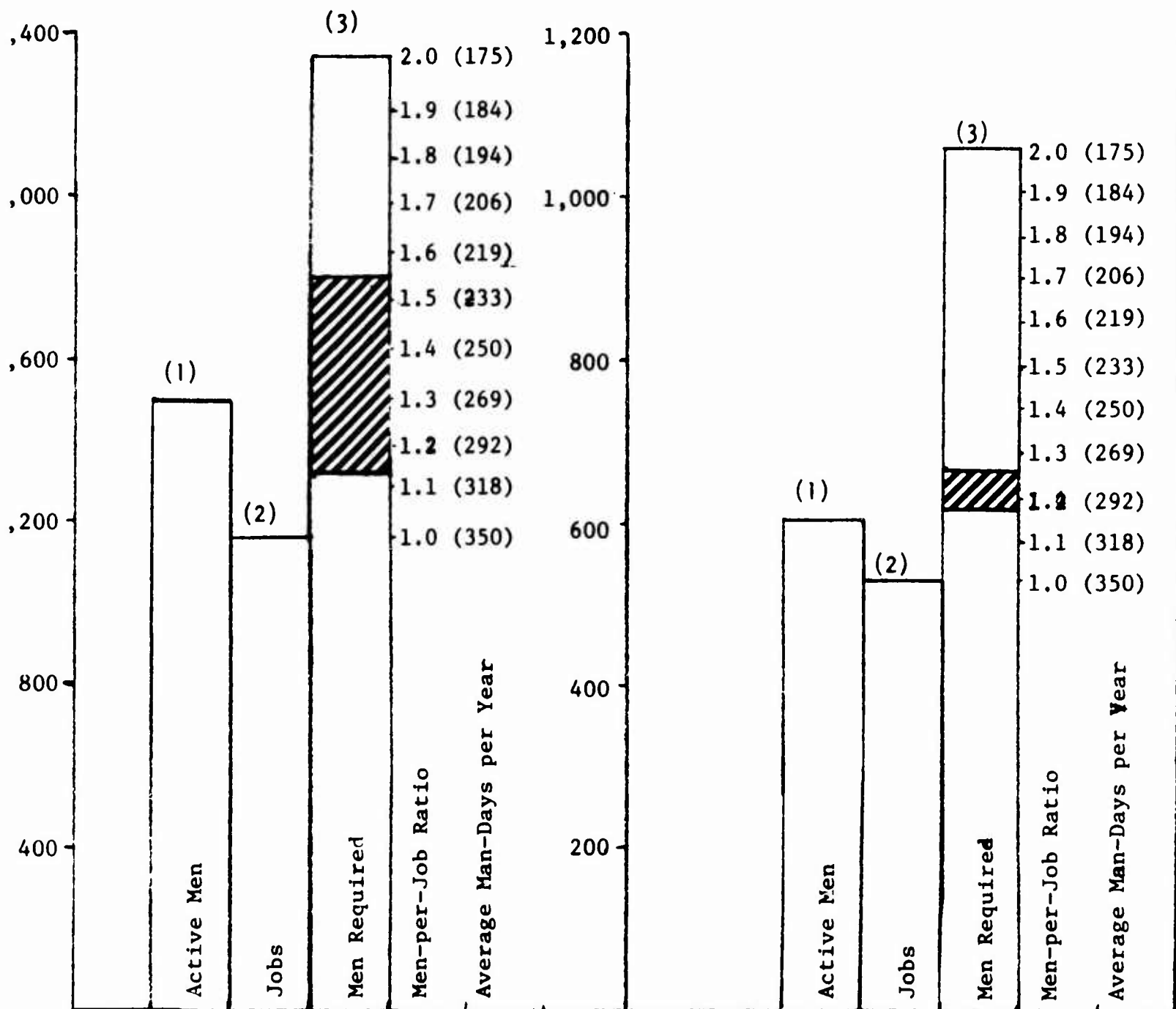


 Estimated Manpower Requirement Range.

MSTS UNLICENSED ENGINE DEPARTMENT PERSONNEL
REQUIREMENTS AND AVAILABILITY
AS OF 30 APRIL 1966

Skilled Engine Department

Unskilled Engine Department

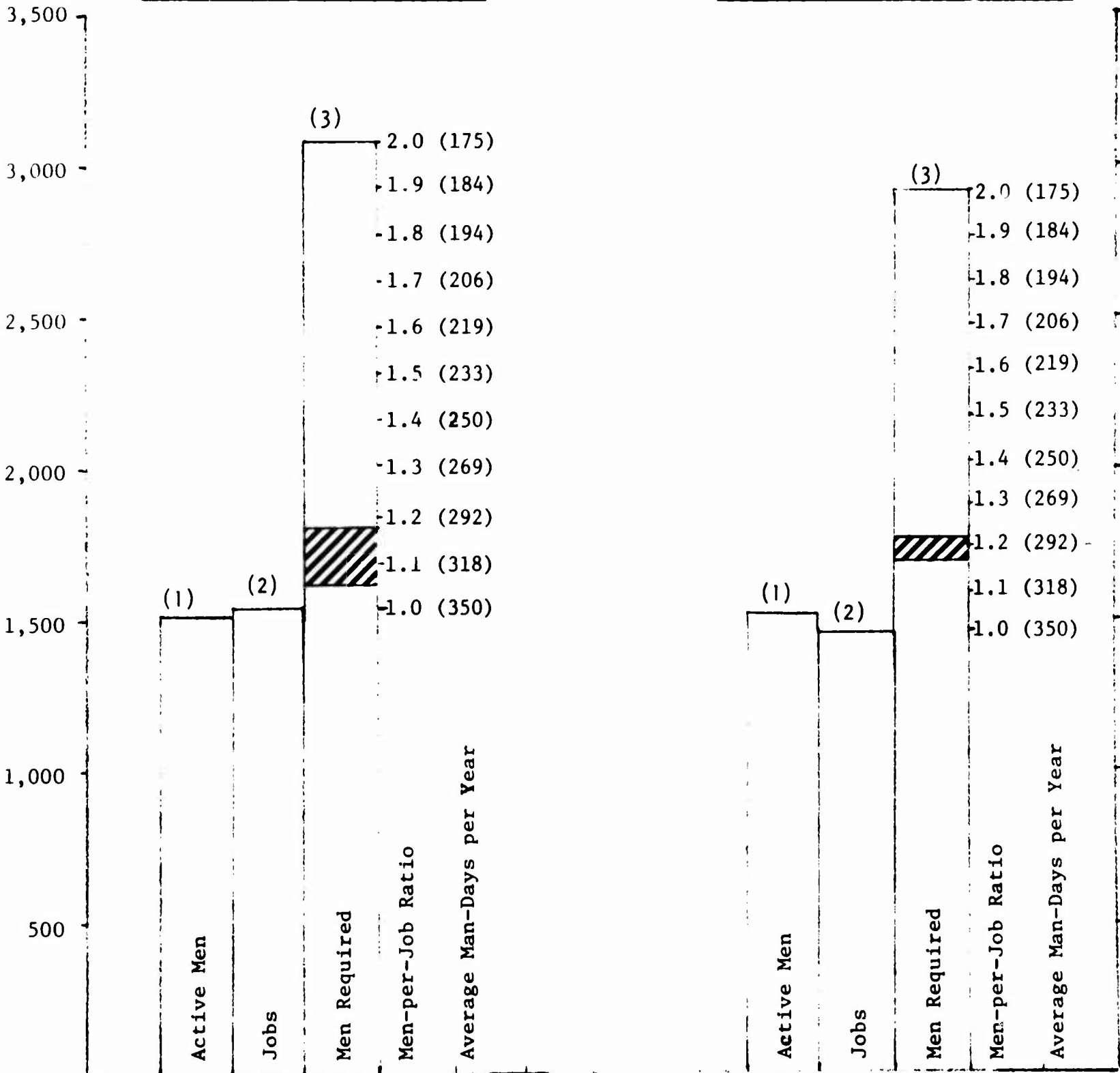


 Estimated Manpower Requirement Range.

MSTS STEWARD'S DEPARTMENT PERSONNEL
REQUIREMENTS AND AVAILABILITY
AS OF 30 APRIL 1966

Skilled Steward's Department

Unskilled Steward's Department



 Estimated Manpower Requirement Range.

-16-
TABLE 1

MANPOWER REQUIREMENT RANGES
FOR OCEANGOING SHIPS,
MSTS AND PRIVATELY OPERATED
AS OF APRIL 1966 ^{a/}

Job Category	Fleet Group ^{b/}	No. of Jobs ^{c/}	Men-per-Job Ratio:		Manpower Requirement	
			Actual, Study Year ^{d/}	Allowance Estimate ^{e/}	Range ^{f/}	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deck Officers	MSTS	492	1.34	1.17	659	576
	Pvt. Op.	6,481	1.53	1.39	9,916	9,034
	Total	6,973	----	----	10,575	9,610
Engineering Officers	MSTS	672	1.61	1.17	1,082	786
	Pvt. Op.	7,035	1.65	1.40	11,608	9,826
	Total	7,707	----	----	12,690	10,612
Radio Officers	MSTS	129	1.05	1.17	135	151
	Pvt. Op.	1,316	1.42	1.28	1,869	1,690
	Total	1,445	----	----	2,004	1,841
Staff Officers	MSTS	143	1.21	1.17	173	167
	Pvt. Op.	743	1.43	1.13	1,062	841
	Total	886	----	----	1,235	1,008
UNLICENSED:						
Deck Dept., Skilled	MSTS	1,323	1.23	1.17	1,627	1,548
	Pvt. Op.	11,299	1.57	1.14	17,739	12,901
	Total	12,622	----	----	19,366	14,449
Deck Dept., Unskilled	MSTS	306	1.66	1.17	508	358
	Pvt. Op.	4,205	1.67	1.12	7,022	4,701
	Total	4,511	----	----	7,530	5,059
Engine Dept., Skilled	MSTS	1,166	1.55	1.17	1,807	1,364
	Pvt. Op.	10,830	1.49	1.14	16,137	12,307
	Total	11,996	----	----	17,944	12,671
Engine Dept., Unskilled	MSTS	530	1.26	1.17	668	620
	Pvt. Op.	3,267	1.61	1.11	5,260	3,636
	Total	3,797	----	----	5,928	4,256

(continued next page) --

TABLE 1 (Continued)

Steward's	MSTS	1,541	1.05	1.17	1,618	1,803
Dept.,	Pvt. Op.	<u>7,769</u>	1.58	1.14	<u>12,275</u>	<u>8,864</u>
Skilled	Total	9,310	----	----	13,893	10,667
Steward's	MSTS	1,451	1.22	1.17	1,770	1,698
Dept.,	Pvt. Op.	<u>8,522</u>	1.49	1.12	<u>12,698</u>	<u>9,559</u>
Unskilled	Total	9,973	----	----	14,468	11,257
TOTALS	MSTS	7,753	----	----	10,047	8,071
	Pvt. Op.	<u>61,467</u>	----	----	<u>95,586</u>	<u>73,359</u>
	Total	69,220	----	----	105,633	81,430

a/ - MSTS: as of 30 April 1966.
Pvt. Op.: as of 1 April 1966.

b/ - MSTS = Civil Service-manned ships.
Pvt. Op. = privately operated oceangoing ships.

c/ - MSTS: from Table C-1, column 6.
Pvt. Op.: from Table D-5, column 6.

d/ - MSTS: from Table C-4, column 4.
Pvt. Op.: from Table D-4, column 4.

e/ - MSTS: Personnel Ceiling Allowance includes a 17% Replacement Reserve to cover port relief requirements, vacations, illness, etc.
Pvt. Op.: from Table F-1, column 7.

f/ - Column 6 = column 3 multiplied by column 4.
Column 7 = column 3 multiplied by column 5.

TABLE 2

MANPOWER AVAILABILITY
FOR OCEANGOING SHIPS,
MSTS AND PRIVATELY OPERATED
AS OF MID - 1966^{a/}

Job Category	Fleet Group ^{b/}	No. of Men Employed during Study Year ^{c/}	No. of Men Active, Mid - 1966 ^{d/}	-
(1)	(2)	(3)	(4)	
Deck Officers	MSTS	515	610	
	Pvt. Op.	<u>9,021</u>	<u>6,838</u>	
	Total	9,536	7,448	
Engineering Officers	MSTS	807	956	
	Pvt. Op.	<u>10,766</u>	<u>8,613</u>	
	Total	11,573	9,569	
Radio Officers	MSTS	106	126	
	Pvt. Op.	<u>1,774</u>	<u>1,382</u>	
	Total	1,880	1,508	
Staff Officers	MSTS	135	160	
	Pvt. Op.	<u>830</u>	<u>606</u>	
	Total	965	766	
UNLICENSED:				
Deck Dept., Skilled	MSTS	1,204	1,427	
	Pvt. Op.	<u>16,835</u>	<u>13,114</u>	
	Total	18,039	14,541	
Deck Dept., Unskilled	MSTS	409	484	
	Pvt. Op.	<u>6,753</u>	<u>5,261</u>	
	Total	7,162	5,745	
Engine Dept., Skilled	MSTS	1,277	1,513	
	Pvt. Op.	<u>14,982</u>	<u>11,836</u>	
	Total	16,259	13,349	
Engine Dept., Unskilled	MSTS	510	604	
	Pvt. Op.	<u>4,870</u>	<u>3,847</u>	
	Total	5,380	4,451	

(continued next page) --

TABLE 2 (Continued)

Steward's	MSTS	1,278	1,514
Dept. ,	Pvt. Op.	<u>12,363</u>	<u>9,767</u>
Skilled	Total	13,641	11,281
Steward's	MSTS	1,276	1,511
Dept. ,	Pvt. Op.	<u>12,717</u>	<u>10,046</u>
Unskilled	Total	13,993	11,557
TOTALS	MSTS	7,517	8,905
	Pvt. Op.	<u>90,911</u>	<u>71,310</u>
	Total	98,428	80,215

a/ - MSTS: Manpower estimates, as of 30 April 1966, assume that the percentage distribution of the known total of 8,905 MSTS Civilian Marine Personnel among the 10 job categories is the same as during 1962.

Pvt. Op.: Manpower estimates, as of 30 June 1966, are projected from the Study Year work force size, assuming that the average annual net attrition rates observed for 1959 - 1962 have remained constant over the intervening 3 1/2 years.

b/ - MSTS: Civil Service-manned ships.
Pvt. Op.: privately operated oceangoing ships.

c/ - MSTS: Study Year = 1962.
Data from Table C-3, column 5.
Pvt. Op.: Study Year = 1 April 1962-31 March 1963.
Data from Table D-6, column 2.

d/ - MSTS: from Table C-6, column 3.
Pvt. Op.: from Table D-6, column 4.

CHAPTER III

MANPOWER REQUIREMENTS AND AVAILABILITY FOR PRIVATELY OPERATED OCEANGOING SHIPS

Estimates of the current manning requirements and of the seagoing personnel available to meet those requirements of the privately operated oceangoing fleet of 1,175 ships are summarized by job category in a series of bar graphs (Figures 7 through 16) and in Tables 1 and 2. Table 3 is a summary of manpower shortage and surplus estimates for the coming year at various attrition rates for each job category. The total numbers of Deck Officers and Engineering Officers holding valid unlimited licenses, as of 1963, are shown in Table 4 by last period of employment under articles. The estimates of available manpower are derived from the numbers of men employed under articles during the Shipboard Manpower Study Year (1 April 1962 - 31 March 1963), adjusted for estimated net attrition over the intervening period. All estimates in this chapter are based upon information developed by the MTRB Staff under the direction of the Shipboard Mechanization and Manpower Committee during its study of maritime manpower. (See Appendixes B, D, E, and F.)

Assuming an average annual net attrition rate of 4 per cent from the end of 1962 through mid-1967, the data indicate shortages during the coming year in all 10 categories. The anticipated shortages range from 242 to 1,818 men in the four Officer categories and from 367 to 1,976 men in the six Unlicensed categories. Even at an average annual net attrition rate of 2 per cent over that period, shortages ranging from 97 to 900 men would occur in all four Officer categories. At the 2-per-cent level, however, all six Unlicensed categories show surpluses ranging from 350 to 1,497 men.

Taking the Deck Officer category as an example (Figure 7), Bars 1 and 2 show that there were 5,899¹⁰ shipboard jobs and 9,021 men employed under articles to fill them¹¹ aboard privately operated oceangoing ships during the Study Year. The four lines radiating from Bar 2 represent straight-line average annual net attrition rates of 2, 4, 6, and 8 per cent over the period from the end of 1962 to mid-year 1966.

¹⁰From Table D-4, line 1, column 3.

¹¹From Table D-6, line 1, column 2. Since only employment under articles is included in the data, men who worked only as Port Relief Officers are not included.

The tic marks of Bar 3 indicate the projected numbers of active men, as of 30 June 1966, corresponding to the specified attrition rates. The broken line drawn across Bar 3 shows the projected number of active men corresponding to the average attrition rate of 6.9 per cent¹² observed for 1959-1962. At the 6.9 per cent rate, the current number of active men would be 75.8 per cent of the 1962 year-end work force, or 6,838 men.¹³

Bar 4 shows the 6,481 current shipboard jobs,¹⁴ as of 1 April 1966. Each tic mark on the right side of Bar 5 indicates the number of men required to fill these 6,481 Deck Officer jobs at the specified men-per-job ratio. The parenthesized number of days to the right of each ratio shows the average annual employment per man that would be required to fill these 6,481 jobs, assuming that the average shipboard job is manned 350 days per year.

The shaded area on Bar 5 shows the estimated manpower requirement range. The lower limit of this range corresponds to an estimated ratio of 1.39 men per job,¹⁵ including allowances for vacations, port relief requirements, and hospitalization. At the 1.39 ratio, the manpower requirement would be 9,034 men¹⁶. If each of the 6,481 jobs were filled for an average of 350 days per year, these 9,034 Deck Officers would have to average 252 days of shipboard employment (including work as Port Relief Officers) during the year. At the projected (6.9 per cent) attrition level, only 6,838 men are available to meet this requirement. This would indicate the need to add 2,196 Deck Officers to the work force during the coming year to meet the estimated immediate manpower requirement; but this does not allow for attrition during the year.

The upper limit of the (shaded) estimated manpower requirement range corresponds to the 1.53¹⁷ ratio (shown on Bar 2) between the number of Deck Officers employed under articles and the number of Deck Officer jobs aboard privately operated oceangoing ships during the Study Year. Applying this ratio to the 6,481 current Deck Officer jobs, the manpower requirement becomes 9,916 men.¹⁸ If each job were filled for an average of 350 days during the year, these 9,916 men would have to average 228 days of employment, including port relief, during the year. With only 6,838 men available, however, it would be necessary to add 3,078 Deck Officers to the work force during the year to meet the expected manpower requirement, including attrition during the year.

¹²From Table D-6, line 1, column 6.

¹³From Table 2, line 2, columns 3 and 4.

¹⁴From Table 1, line 2, column 3.

¹⁵From Table 1, line 2, column 5.

¹⁶From Table 1, line 2, column 7.

¹⁷From Table 1, line 2, column 4.

¹⁸From Table 1, line 2, column 6.

Use of the Study Year men-per-job ratio of 1.53 to compute the upper limit of the estimated manpower requirement range assumes that the 6.9 per cent attrition rate still applies. However, it seems probable that the manpower availability projections based on the 1959-1962 attrition rates are under-estimates, since lower attrition generally characterizes times when jobs are more plentiful and more regular -- as they are today, relative to 1959-1962. The tic marks on the left side of Bar 5 indicate the estimated manpower requirements, including attrition, which corresponds to average annual net attrition rates of 2, 4, and 6 percent over the past 3 1/2 years and through the coming year.

If a Deck Officer attrition rate of 4 per cent is assumed, a comparison of the estimated manpower requirements and availability (the 4-per-cent levels marked on Bars 5 and 3, respectively) indicate the need to add 1,787 Deck Officers to the work force during the coming year.¹⁹ This corresponds to a ratio of about 1.47 men per job. If a 2 per cent attrition rate is assumed, the size of the estimated shortage is reduced to 900 men,²⁰ corresponding to a 1.43 ratio.

Comparing the manpower requirements and availability for each job category (Figures 7 through 16) at the 4-per-cent attrition level, the data indicate shortages during the coming year in all 10 categories. The anticipated shortages range from 242 to 1,818 men in the four Officer categories and from 367 to 1,976 in the six Unlicensed categories, as shown in Table 3 (column 4).

Even at an average annual net attrition rate of 2 per cent -- which seems unrealistically low -- shortages are still indicated in each Officer category, although their magnitude is reduced; these shortages range from 97 to 900 men. At the 2-per-cent level, however, all six Unlicensed categories show manpower surpluses of from 350 to 1,497 men. (See Table 3, column 5.)

To meet these anticipated shortages, a primary source of potential manpower would appear to be those men who did not sail under articles during the past year but were active during the preceding several years. The numbers of Deck Officers and Engineering Officers holding valid unlimited licenses, as of 31 March 1963, are shown in Table 4 by highest license held and by last period of employment under articles. Those who sailed under articles during the Study Year (column 2) represent the "active men" shown in Bar 2 of Figures 7 and 8; they form the base from which current manpower availability is estimated (Bar 3, Figures 7 and 8). It seems unlikely that many of those who had not sailed under articles since

¹⁹From Table 3, line 3, column 4.

²⁰From Table 3, line 3, column 5.

-24-

1956 (column 4) are actively sailing today. The men who last sailed under articles during the five years preceding the Study Year (column 3) represent a manpower pool of uncertain size and availability. As of March 1963, this group contained one inactive Deck Officer for every 3 actively sailing during the Study Year and one inactive Engineering Officer for every four sailing during that year.

14,

12,

10,

8,

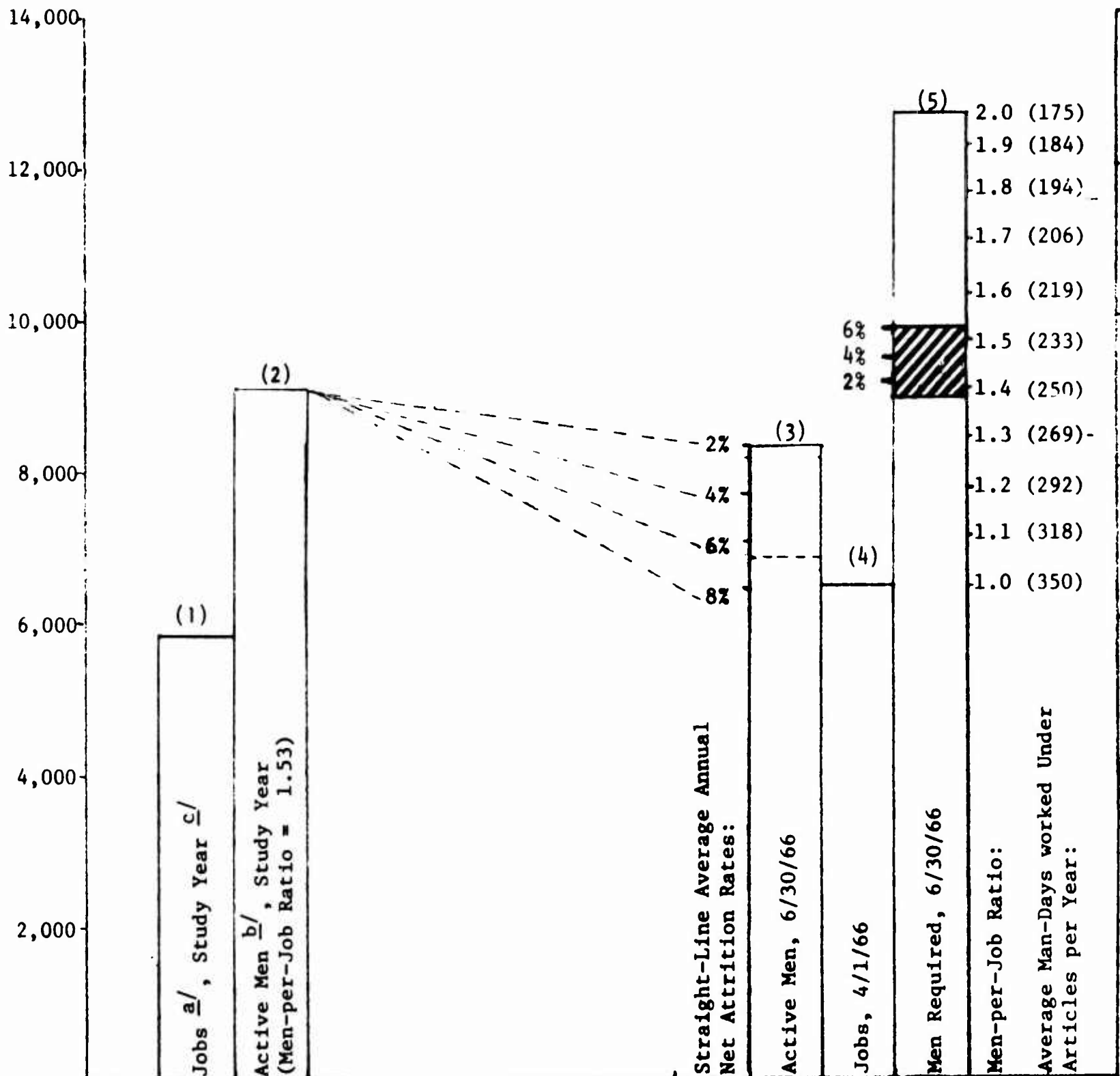
6,

4,

2,

FIGURE 7.

DECK OFFICER
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year=4/1/62 - 3/31/63.

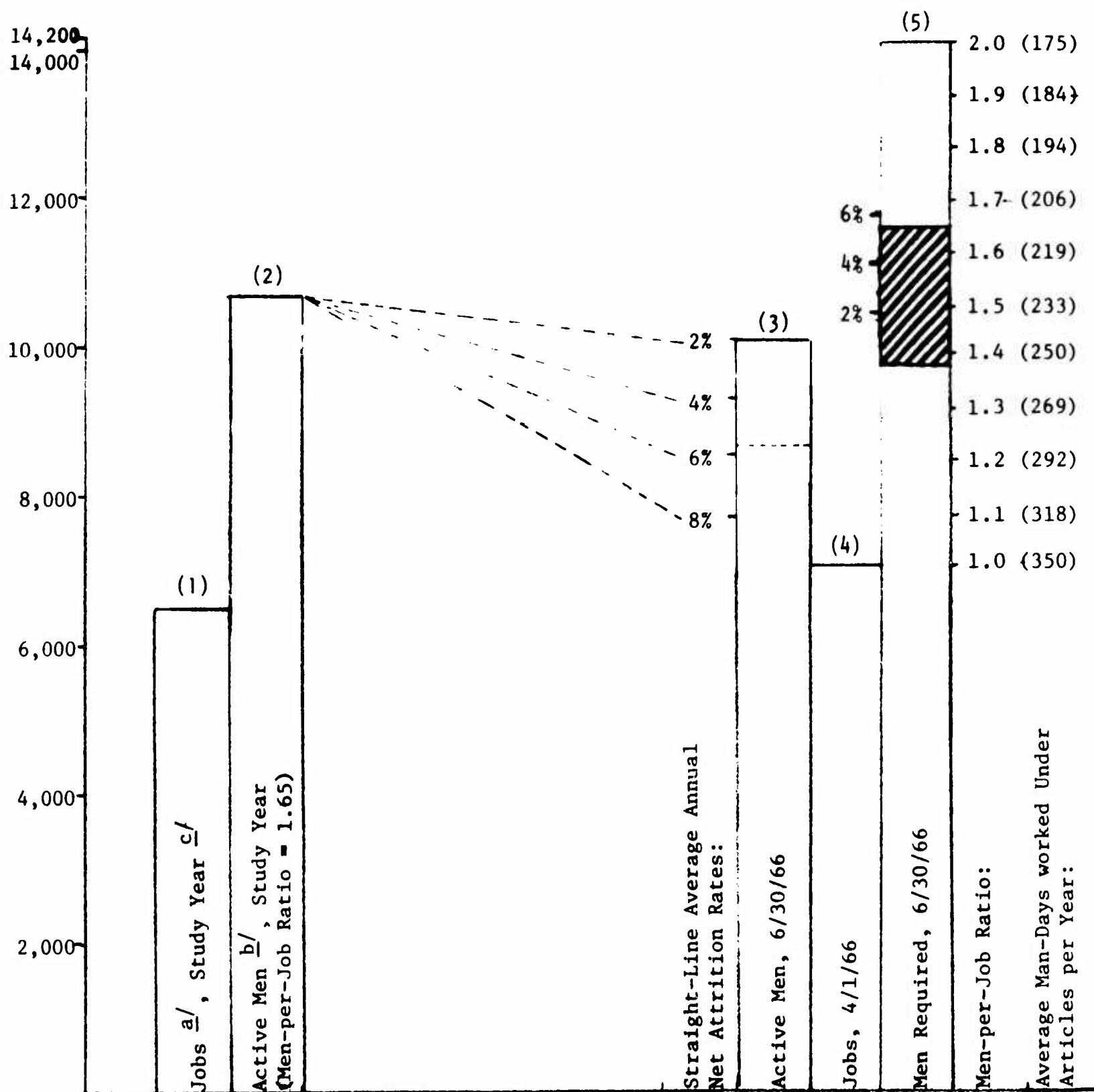
----- Work Force Size, Projected from 1959 - 1962 attrition data.



Estimated Manpower Requirement Range.

FIGURE 8.

ENGINEERING OFFICER
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year = 4/1/62 - 3/31/63.

----- Work Force Size, Projected from 1959 - 1962 attrition data.



Estimated Manpower Requirement Range.

FIGURE 9.

RADIO OFFICER
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS

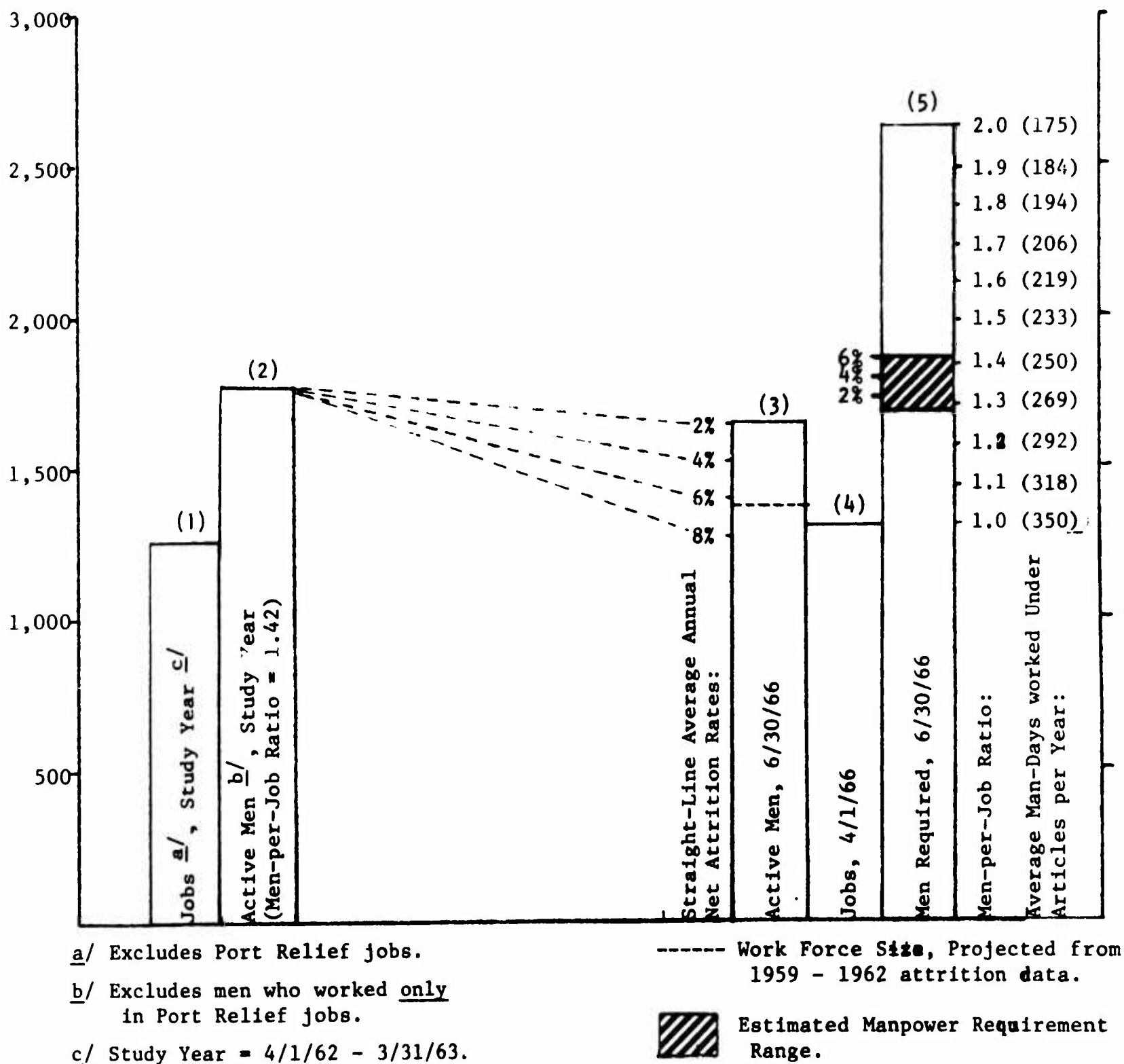
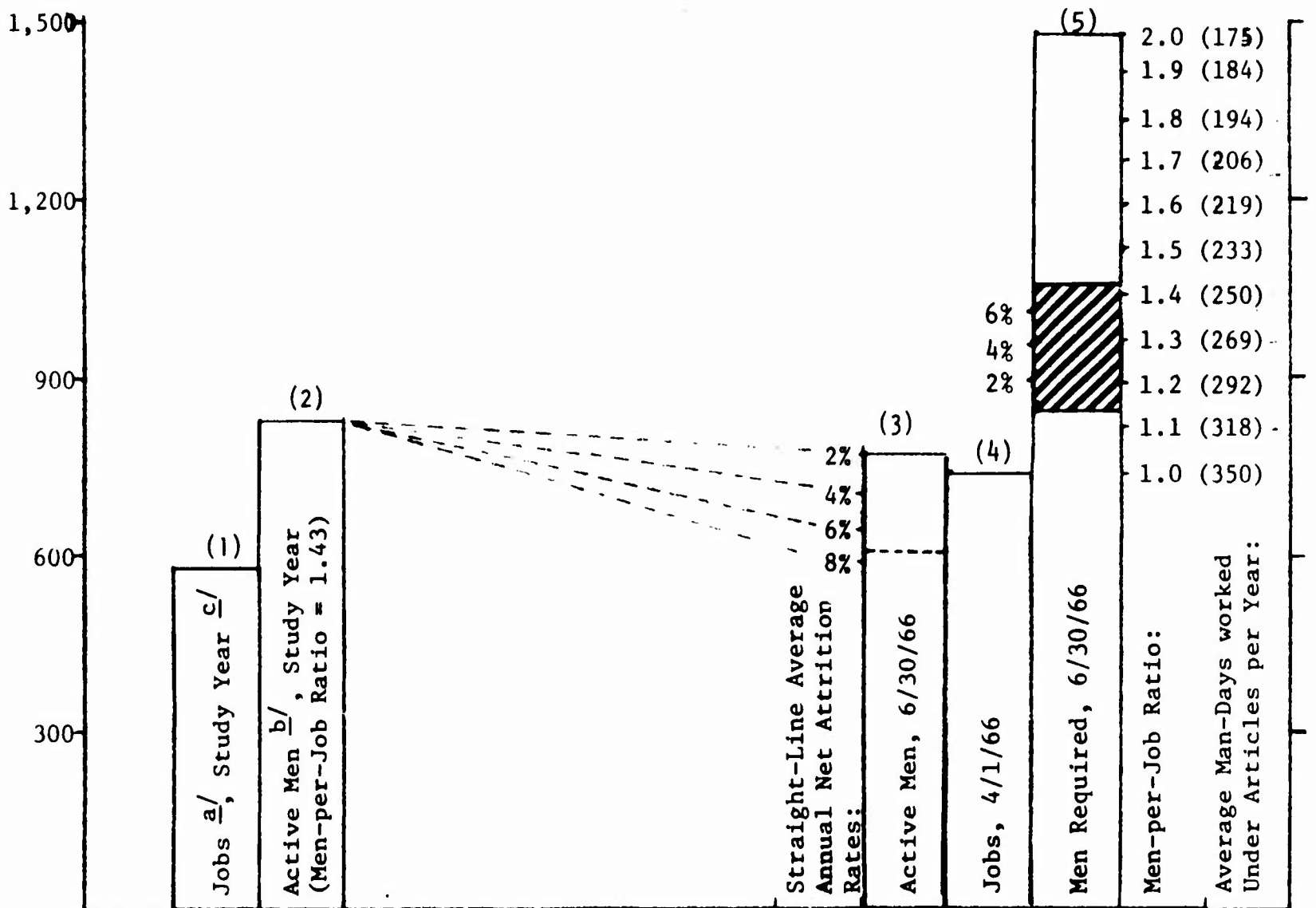


FIGURE 10.

STAFF OFFICER
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only
in Port Relief jobs.

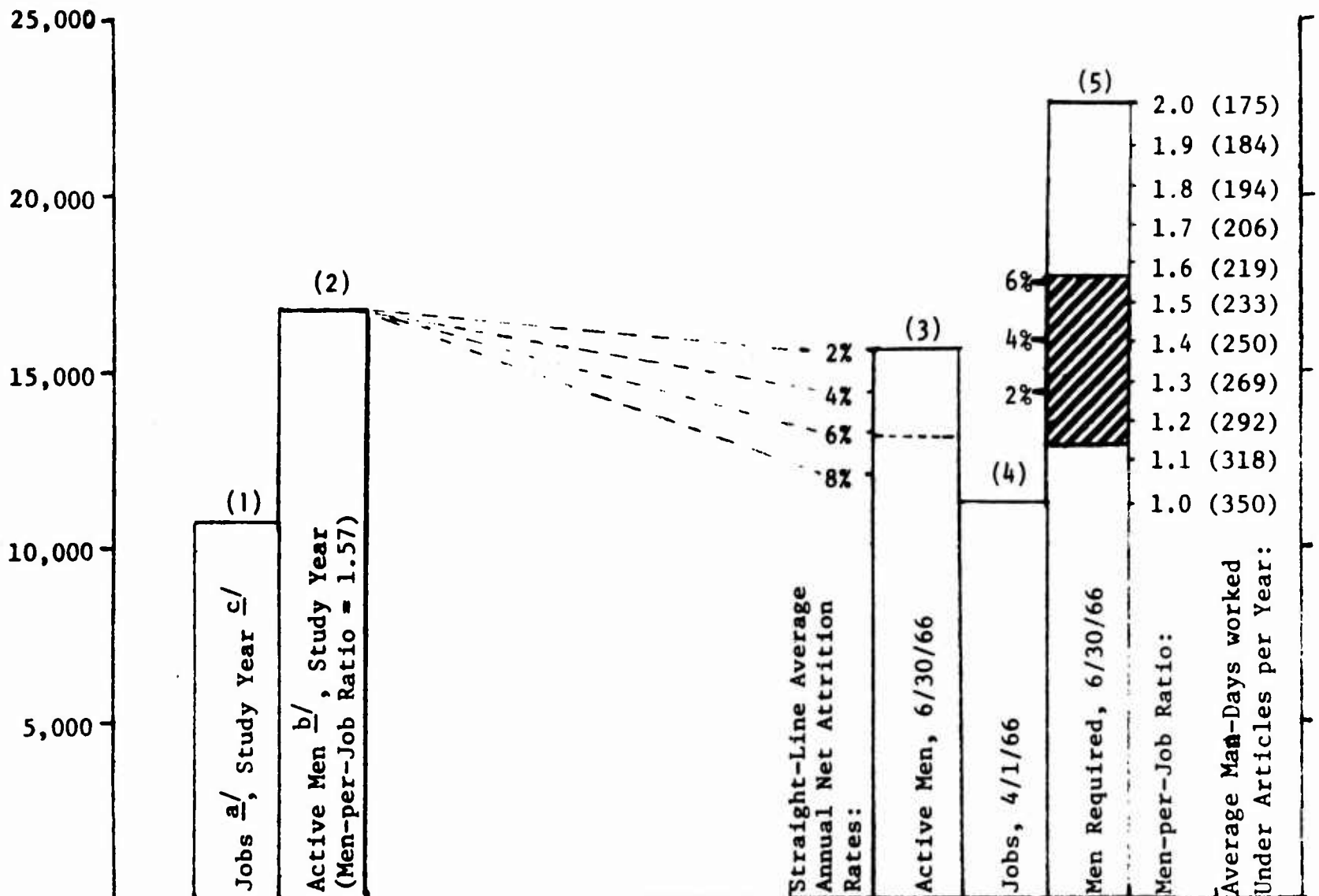
c/ Study Year = 4/1/62 - 3/31/63.

----- Work-Force Size, Projected from
1959 - 1962 attrition data.

 Estimated Manpower Requirement
Range.

FIGURE 11.

SKILLED UNLICENSED DECK DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year = 4/1/62 - 3/31/63.

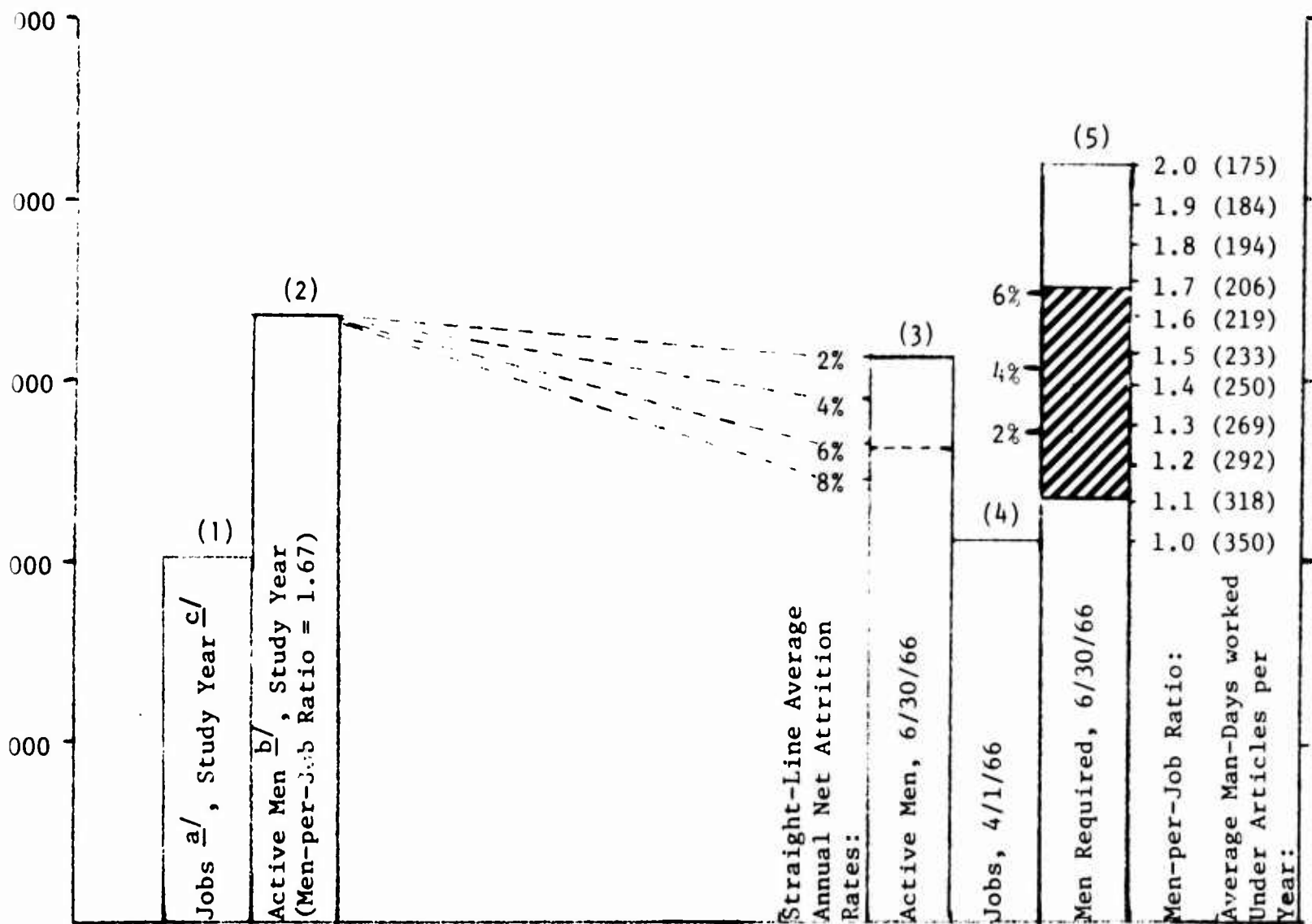
----- Work Force Size, Projected from 1959 - 1962 attrition data.



Estimated Manpower Requirement Range.

FIGURE 12.

UNSKILLED UNLICENSED DECK DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



^{a/} Excludes Port Relief jobs.

^{b/} Excludes men who worked only in Port Relief jobs.

^{c/} Study Year = 4/1/62 - 3/31/63.

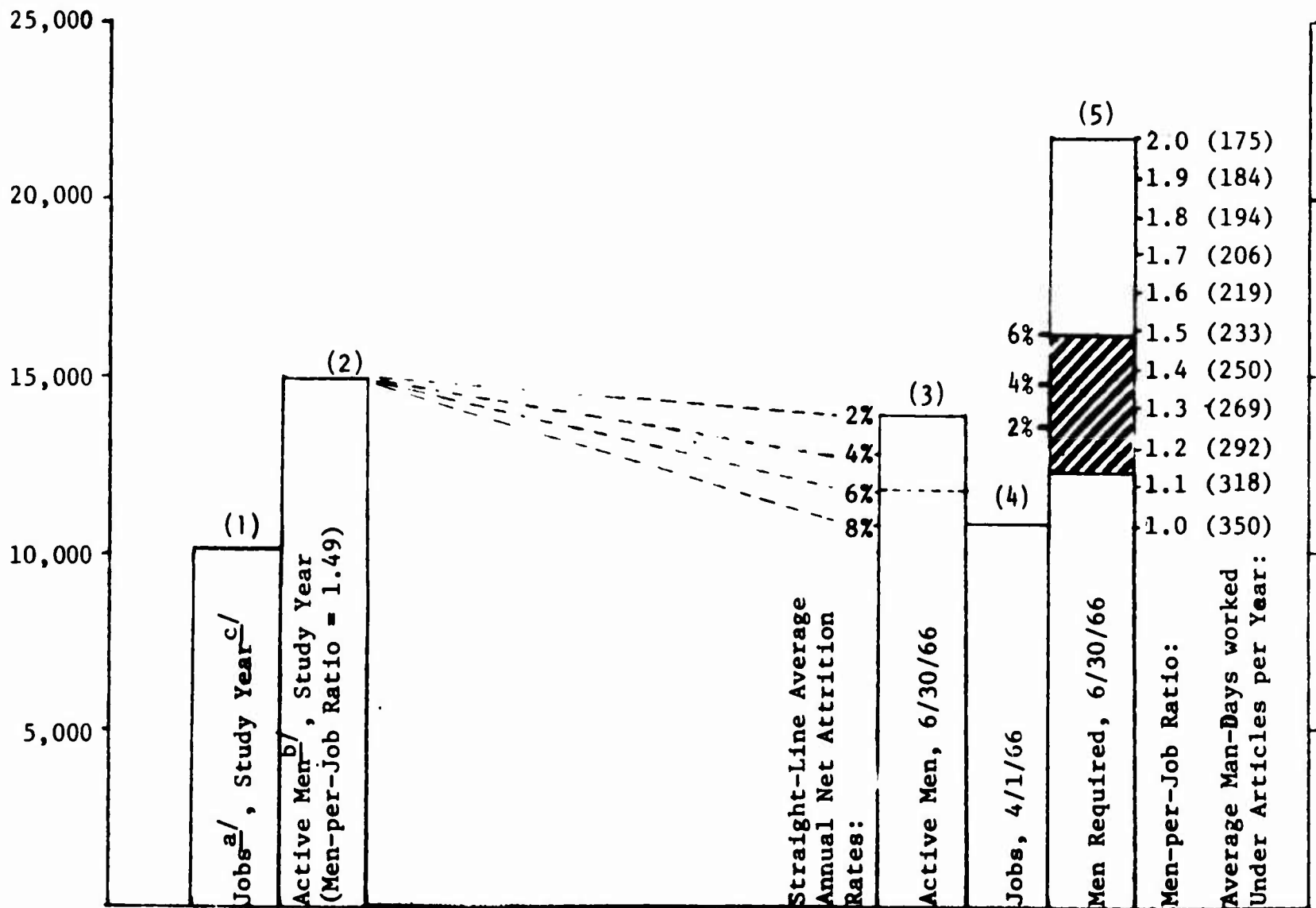
----- Work Force Size, Projected from 1959 - 1962 attrition data.



Estimated Manpower Requirement Range.

FIGURE 13.

SKILLED UNLICENSED ENGINE DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year = 4/1/62 - 3/31/63.

----- Work Force Size, Projected from 1959 - 1962 attrition data.


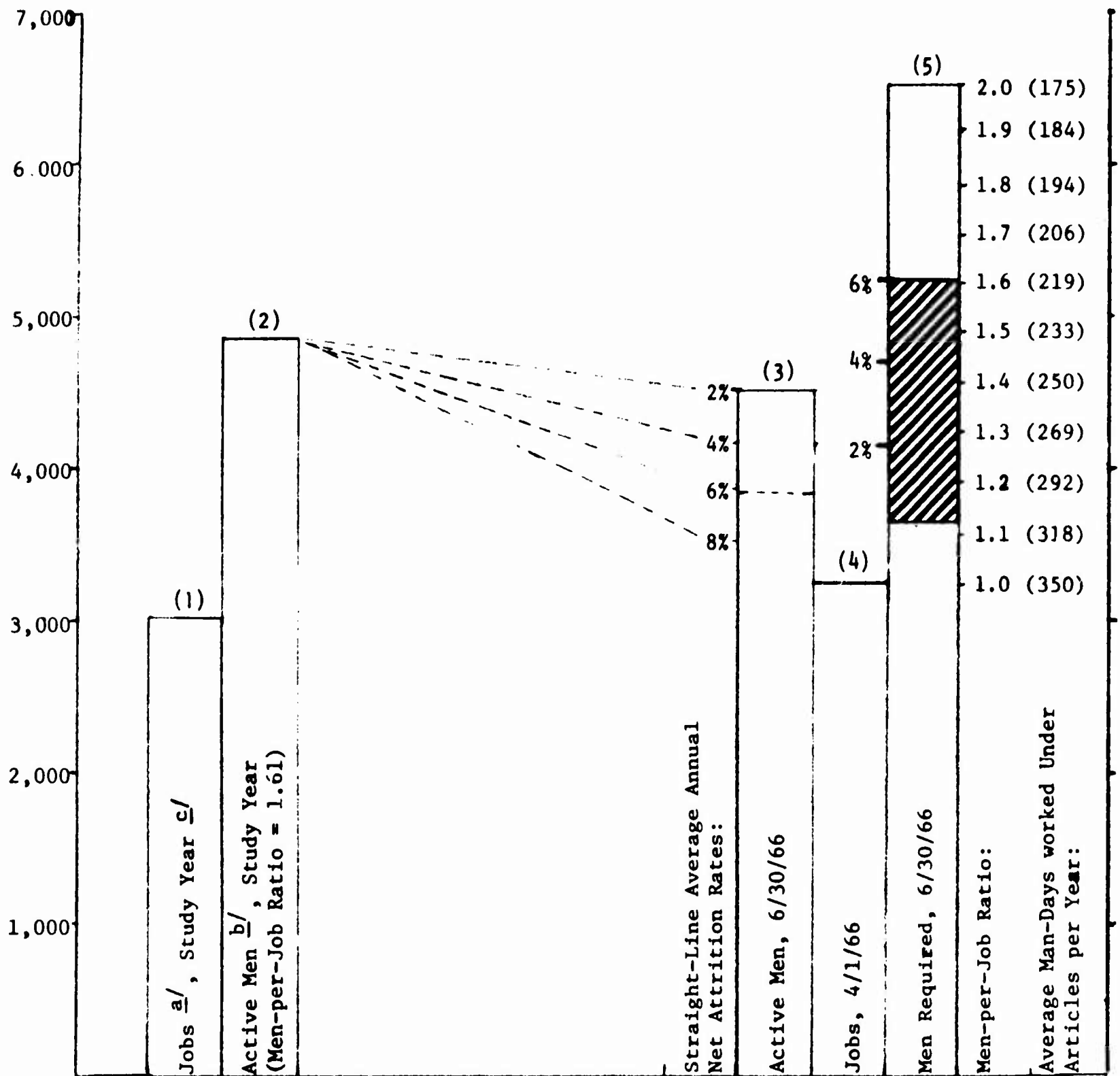
 Estimated Manpower Requirement Range.

FIGURE 14.

UNSKILLED UNLICENSED ENGINE DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

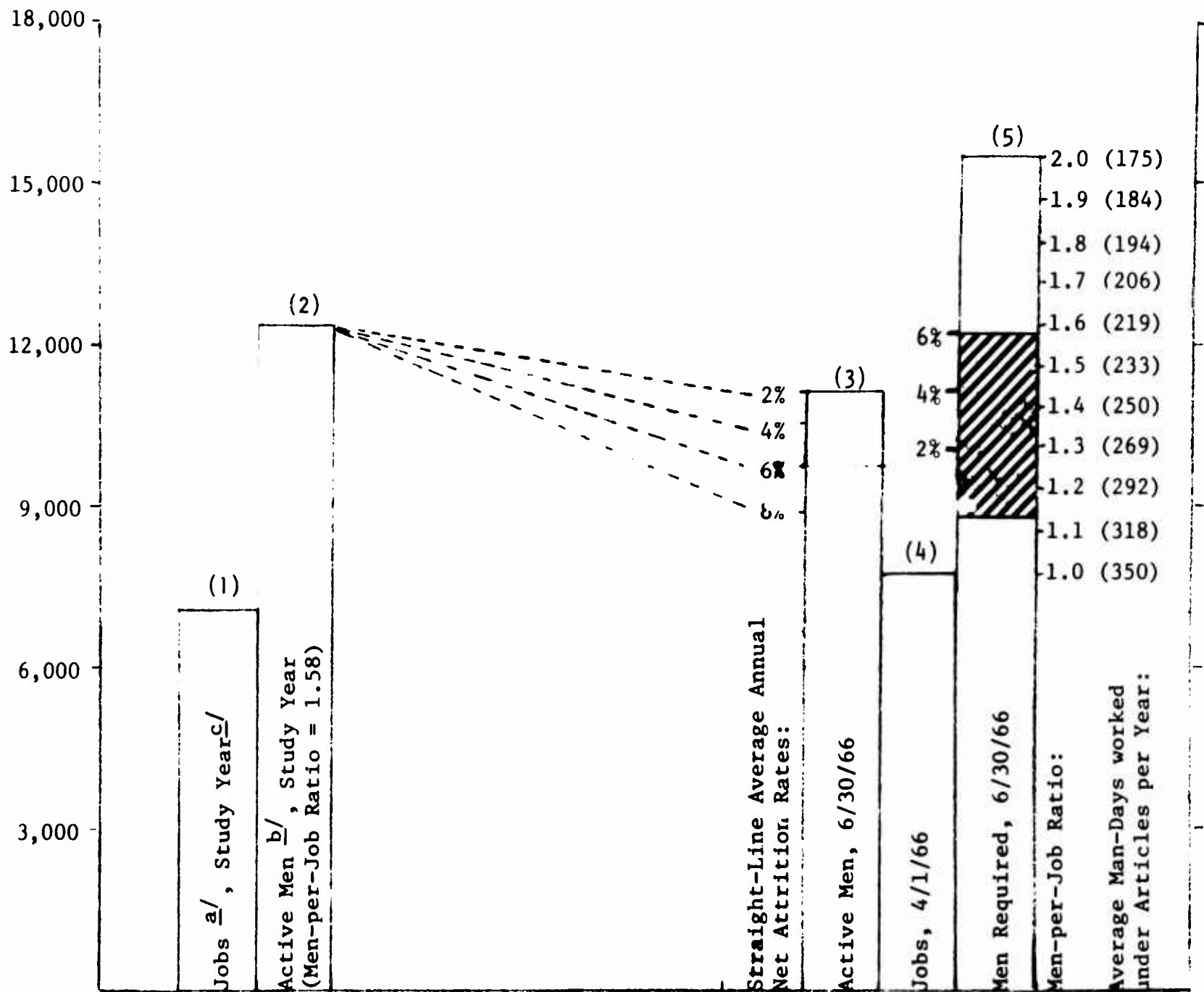
b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year = 4/1/62 - 3/31/63.

----- Work Force Size, Projected from 1959 - 1962 attrition data.

 Estimated Manpower Requirement Range.

SKILLED STEWARD'S DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

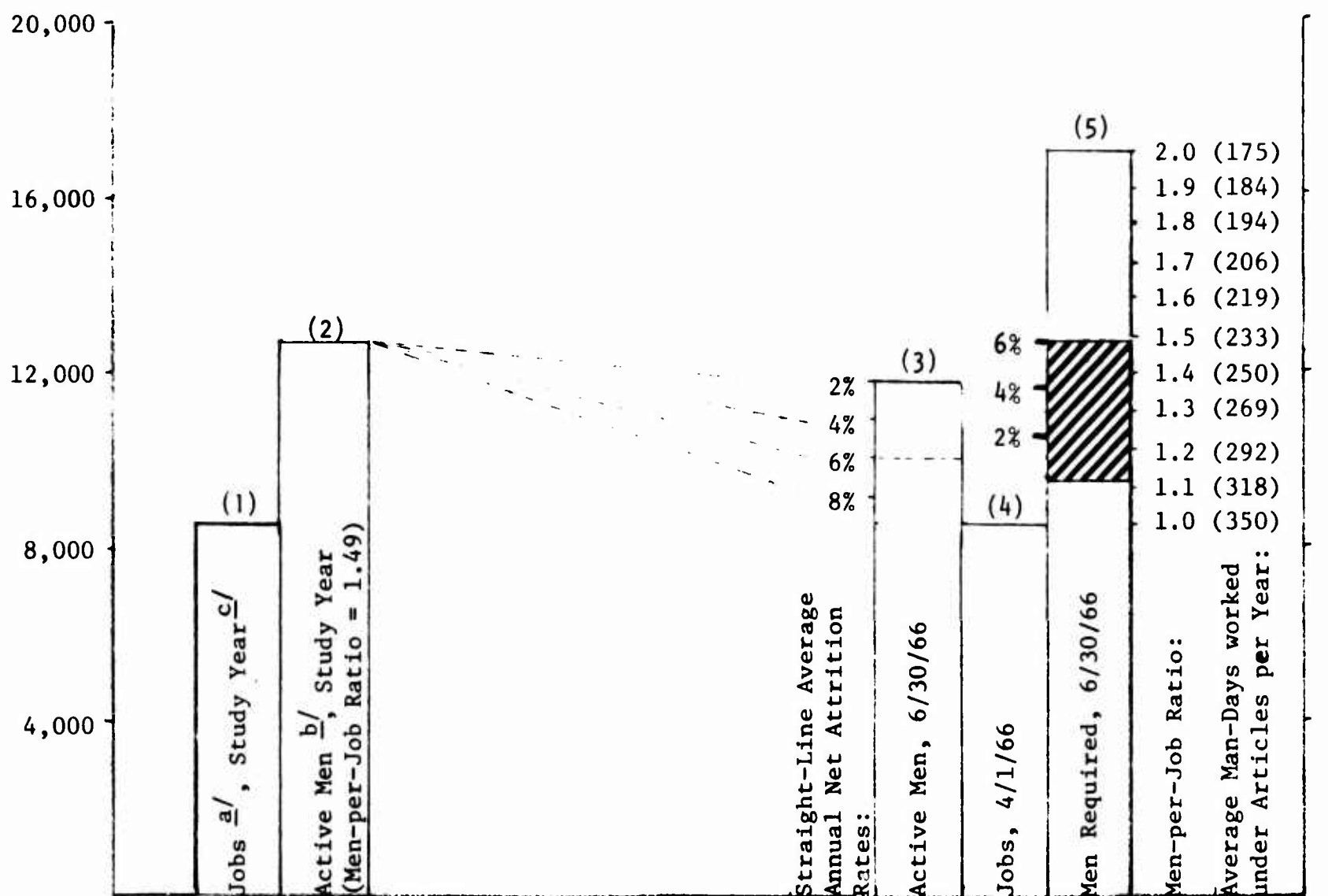
c/ Study Year = 4/1/62 - 3/31/63.

----- Work Force Size, Projected from 1959 - 1962 attrition data.

 Estimated Manpower Requirement Range.

FIGURE 16.

UNSKILLED STEWARD'S DEPARTMENT
REQUIREMENTS AND AVAILABILITY:
PRIVATELY OPERATED OCEANGOING SHIPS



a/ Excludes Port Relief jobs.

b/ Excludes men who worked only in Port Relief jobs.

c/ Study Year = 4/1/62 - 3/31/63.

----- Work Force Size, Projected from 1959 - 1962 attrition data.

Estimated Manpower Requirement Range.

TABLE 3
MANPOWER SHORTAGE AND SURPLUS ESTIMATES
AT VARIOUS ATTRITION RATES
FOR PRIVATELY OPERATED OCEANGOING SHIPS,
JUNE 1966 - JUNE 1967

Job Category & Projected Attrition Rate	Estimated Manpower Shortage (-) or Surplus (+) at an Avg. Annual Net Attrition Rate of:			
	Projected Rate ^{a/}	6%	4%	2%
(1)	(2)	(3)	(4)	(5)
Deck Officers (6.9%)				
Required	9,916	9,801	9,545	9,290
Available	6,838	7,127	7,758	8,390
Difference	-3,078	-2,674	-1,787	-900
Engineering Officers (5.7%)				
Required	11,608	11,702	11,077	10,451
Available	8,613	8,505	9,259	10,012
Difference	-2,995	-3,197 ^{b/}	-1,818	-439
Radio Officers (6.3%)				
Required	1,869	1,861	1,804	1,747
Available	1,382	1,401	1,526	1,650
Difference	-487	-460	-278	-97
Staff Officers (7.7%)				
Required	1,062	1,014	956	899
Available	606	656	714	772
Difference	-456	-358	-242	-127
UNLICENSED:				
Deck Dept.:				
Skilled (6.3%)				
Required	17,739	17,509	15,973	14,437
Available	13,114	13,300	14,478	15,657
Difference	-4,625	-4,209	-1,495	+1,220
Unskilled (6.3%)				
Required	7,022	6,912	6,175	5,438
Available	5,261	5,335	5,808	6,280
Difference	-1,761	-1,577	-367	+842

(continued next page)

TABLE 3 (Continued)

<u>Engine Dept.:</u>				
<u>Skilled (6.0%)</u>				
Required	16,137	16,137	14,860	13,583
Available	<u>11,836</u>	<u>11,836</u>	<u>12,884</u>	<u>13,933</u>
Difference	- 4,301	- 4,301 ^{b/}	- 1,976	+ 350
 <u>Unskilled (6.0%)</u>				
Required	5,260	5,260	4,719	4,177
Available	<u>3,847</u>	<u>3,847</u>	<u>4,188</u>	<u>4,529</u>
Difference	-1,413	-1,413 ^{b/}	- 531	+ 352
 <u>Steward's Dept.:</u>				
<u>Skilled (6.0%)</u>				
Required	12,275	12,275	11,138	10,001
Available	<u>9,767</u>	<u>9,767</u>	<u>10,632</u>	<u>11,498</u>
Difference	- 2,508	- 2,508 ^{b/}	- 506	+ 1,497
 <u>Unskilled (6.0%)</u>				
Required	12,698	12,698	11,652	10,605
Available	<u>10,046</u>	<u>10,046</u>	<u>10,937</u>	<u>11,827</u>
Difference	- 2,652	- 2,652 ^{b/}	- 715	+ 1,222
 <u>TOTALS</u>				
Required	95,586	95,169	87,899	80,628
Available	<u>71,310</u>	<u>71,820</u>	<u>78,184</u>	<u>84,548</u>
Difference	-24,276	-23,349	- 9,715	+ 3,920

^{a/} - The projected rate, parenthesized in column 1, is taken from Table D-6, column 6.

^{b/} - Same as column 2.

TABLE 4

DECK AND ENGINEERING OFFICERS
HOLDING VALID UNLIMITED LICENSES, AS OF 31 MARCH 1963,
BY LAST PERIOD OF EMPLOYMENT UNDER ARTICLES

Highest Unlimited License Held	No. of Men Holding Valid Licenses, as of 31 March 1963, whose Last Employment under Articles was:		
	during the Study Year, 4/1/62 - 3/31/63	from 1957 to 3/31/62	prior to 1957
(1)	(2)	(3)	(4)
DECK OFFICERS^{a/}			
Master	4,286	1,496	5,922
Ch. Mate	1,876	434	1,963
2nd Mate	1,640	478	2,047
3rd Mate	1,730	742	2,456
TOTALS	9,532	3,150	12,388
ENGINEERING OFFICERS^{b/}			
Ch. Engr.	4,121	1,219	6,578
1st Asst. Engr.	2,111	558	3,270
2nd Asst. Engr.	2,509	649	4,396
3rd Asst. Engr.	2,495	448	2,689
TOTALS	11,236	2,874	16,933

^{a/} - Men holding Unlimited (tonnage) - Any Oceans licenses. Includes 511 men whose employment under articles was entirely outside the Deck Officer job category.

^{b/} - Men holding Unlimited (horsepower) - Steam licenses. Includes 470 men whose employment under articles was entirely outside the Engineering Officer job category.

APPENDIX A

THE PRIVATELY OPERATED FLEET

MarAd Fleet Tabulation

The current size and make-up of the privately operated oceangoing fleet as listed by the Maritime Administration (MarAd) is shown in Table A-1. The several categories of ships that are excluded from this list are described below.

1) Ships operating only in inland waters, lakes, bays and sounds are excluded. These include hundreds of ships, some 270 on the Great Lakes alone. Other examples are the ferries and excursion boats operating on Puget Sound, between Cape Cod and Martha's Vineyard, and between Seattle and Vancouver, British Columbia.

2) While ships that are privately operated for MSTs under General Agency Agreement are included, ships transferred to government agencies other than MSTs are excluded, whether they are operated by a government agency or under contract by a private operator. The same is true of military-owned ships. Examples are government oceanographic research ships, Army Corps of Engineers ocean-going dredges, and Interior Department ships operating in the Trust Territories.

3) Certain special-purpose ships are excluded, even though privately owned and operated. Examples are cable-laying ships and oceangoing tugs and barges.

4) If, on the basis of bulletins supplied by the operating company, a ship that is normally included on the MarAd list is idle for more than 14 days, it is classed as inactive and excluded from the list for the duration of its lay-up. This includes some ships that are undergoing overhaul or repairs as well as those which are removed from operation for other reasons.

It can be seen that, despite its title, the MarAd list excludes certain oceangoing ships which exceed 1,000 gross tons and operate regularly under articles.

Shipboard Manpower Study Fleet Tabulation

The numbers of ships operating regularly under articles during the period, 1 April 1962 - 31 March 1963, taken from Shipboard Manpower are shown in Table A - 2. The total number of ships in the MarAd listing as of 1 October 1961 (the closest date to the Study Year for which published MarAd data of this type are available) is 923 ships. * Taking the number of ships employing Engineering Officers as the basis for comparison, and deducting the Great Lakes ships, 175 more ships are included in Shipboard Manpower than in the October 1961 MarAd tabulation. This difference reflects basic differences in the criteria for inclusion of ships in the two tabulations.

In general, all ships of 1,000 gross tons and over were included in Shipboard Manpower if they operated at least 200 days under articles during the Study Year, 1 April 1962 - 31 March 1963. In totaling days under articles, voyages made with skeleton crews (for instance, a freighter crew of 3 men for 10 days) were excluded under the assumption that the ship probably was being towed; periods of lay-up for overhaul and repairs, during which a small crew remained aboard but the ship was not under articles, were automatically excluded because no discharges were received. Thus, to qualify for inclusion, a ship had to operate 200 days or more under articles with a substantially full crew.

For ships of less than 1,000 gross tons, the general criteria were that the ship operated at least 200 days under articles during the Study Year and that the average crew size was at least 15 men, all of whom were covered under articles. However, for ships in this tonnage range, the criteria were applied somewhat flexibly. Large tugs were included if they operated as ocean-going tugs, under articles, for a large fraction of the Study Year, with a full crew aboard. Ferries which operated less than 200 days under articles during the Study Year were included if they operated under articles for all or most of their total period of operation. (This permitted the inclusion of ferries which were otherwise qualified but operated seasonally. For example, the ferries serving Martha's Vineyard from Cape Cod were included.) These vessels were included because a significant number of their Deck and Engineering Officers hold unlimited ocean licenses, even though this is not required by navigation law.

* - Division of Labor Data, Office of Ship Statistics, Maritime Administration, U. S. Department of Commerce, Estimate of Civilian Seafaring Job Potential by Collective Bargaining Groups, U. S. Flag Oceangoing Ships of 1,000 Gross Tons and Over, as of October 1, 1961, Nov. 20, 1961.

TABLE A - 1

MARAD TABULATION OF
U. S. FLAG OCEANGOING SHIPS
OF 1,000 GROSS TONS AND OVER
AS OF APRIL 1, 1966^a

1)	P2-S1-1k (MONTEREY type)	2
2)	P2-S1-1n (ATLANTIC)	1
3)	Ps-S2-11a (STA. ROSA type)	2
4)	P2-S2-9a (BRASIL type)	2
5)	P2-SE2-R3 (PRES. WILSON type)	2
6)	P2-S2-R14 (PRES. ROOSEVELT)	1
7)	P3-S2-DL2 (INDEPENDENCE type)	2
8)	P6-S4-DS1 (UNITED STATES)	1
9)	Misc. (LURLINE)	1
10)	C2-S-AJ4 (STA. ISABEL type)	6
11)	C3-S-BR1 (DEL NORTE type)	3
12)	C4-S1-49a (STA. MAGDALENA type)	<u>4</u>
A) TOTAL PASSENGER & COMBINATION		<u>27</u>
13)	O-1H (FLORIDIAN type)	2
14)	C1-A & C1-B	11
15)	C1-M-AV1	6
16)	C2	178
17)	C3, Marit. Comm. design	124
18)	C3, Replacement	46
19)	C3, Retrofit	3
20)	C4, Marit. Comm. design	22
21)	C4 "Mariner", Std.	58
22)	C4 "Mariner", Automated	14
23)	SAVANNAH	1
24)	C5-S-AX1	2
25)	ZET-1	1
26)	N3-M-A1	1
27)	EC-2	42
28)	VC2-S-AP2 & -AP3	138
29)	Misc. Dry Cargo	<u>45</u>
B) TOTAL DRY CARGO (except REFRIG.)		<u>694</u>
30)	R1-S-DH1	7
31)	R2-ST-AU1	9
32)	R2-S-BV1	<u>2</u>
C) TOTAL REFRIGERATED CARGO		<u>18</u>

TABLE A - 1 (Continued)

33)	T1-M-A2	2	
34)	T1-M-BT1 & -BT2	2	
35)	T2 & T2-A	1	
36)	T2-SE-A1	109	
37)	T3	5	
38)	T4-SE-39a	1	
39)	T5-S-12b	2	
40)	T5-S-41a	4	
41)	C4 Conversion	1	
42)	C1-M-AV1 Conversion	1	
43)	Super-Tanker, Misc.	55	
44)	Misc. Tanker	<u>78</u>	
D)	TOTAL TANKER	<u>261</u>	
E)	TOTAL DRY CARGO (B + C)		<u>712</u>
F)	TOTAL FLEET (A + B + C + D)		<u>1,000</u>

a/ - Source: Division of Ship Data, Maritime Administration (MarAd),
U. S. Department of Commerce.

TABLE A - 2

SHIPBOARD MANPOWER TABULATION OF
U. S. -FLAG SHIPS OPERATING REGULARLY UNDER ARTICLES,
1 APRIL 1962 - 31 MARCH 1963

<u>Job Category</u> (1)	Number of Ships Employing Men in Each Job Category:		
	<u>Total</u> (2)	<u>Gt. Lakes</u> (3)	<u>non-Lakes</u> (4)
1) Deck Officers	1,360	265	1,095
2) Engineering Officers	1,368	270	1,098
3) Radio Officers	1,054	4	1,050
4) Staff Officers	383	30	353
5) Unlicensed Personnel	1,372	266	1,106

APPENDIX B

CATEGORY ASSIGNMENT TECHNIQUE *

In this report, seagoing personnel and jobs are grouped into 10 job categories:

- Deck Officers
- Engineering Officers
- Radio Officers
- Staff Officers
- Unlicensed Deck Department - Skilled Personnel
- Unlicensed Deck Department - Unskilled Personnel
- Unlicensed Engine Department - Skilled Personnel
- Unlicensed Engine Department - Unskilled Personnel
- Steward's Department - Skilled Personnel
- Steward's Department - Unskilled Personnel

Because one man may work in several different job categories and in several different union-management groups or MSTs Areas of employment, it was necessary to develop a category assignment technique. The technique described below is that used in Shipboard Manpower.

Employment Aboard Privately Operated Ships

Information on personnel employed aboard privately operated ships during the Study Year, 1 April 1962 through 31 March 1963, was obtained from Coast Guard files.

All discharges** for the Study Year were sorted first by ship number. A master file of union and union-management groups for each ship was then transferred to the discharge information, so that the applicable union and union-management codes could be linked with each discharge.

Second, the discharges were re-sorted by the men's identification ("Z" or "R") numbers. The computer then totaled the days of employment from all discharges for each man during the Study Year.

* Maritime Transportation Research Board, National Academy of Sciences - National Research Council (NAS-NRC), Shipboard Manpower, NAS-NRC Report 1410, Washington, 1966, Vol. 2, "Preface to Appendixes I through VIII. "

** Throughout this report, the term "discharge" refers to both the "Certificate of Discharge" and "Record of Entry in Continuous Discharge Book. "

Third, a sort by union and union-management group within the records for each man permitted the computer to accumulate, for each man, employment within each group for each job category in which the man worked. Thus, both a man's total employment and his employment within each group are available.

A man employed in officer categories was entered in each job category and in each union and union-management group from which he received any employment. However, since the major union groups for unlicensed employment include all personnel (that is, the six unlicensed categories in the above list), only one unlicensed job category was assigned to a man within any one union or union-management group -- despite the fact that, within that group, he may have worked in two or more of these categories. For purposes of data analysis, the six unlicensed job categories were arbitrarily assigned the following order of precedence:

- 1) Skilled Deck Department
- 2) Skilled Engine Department
- 3) Skilled Steward's Department
- 4) Unskilled Deck Department
- 5) Unskilled Engine Department
- 6) Unskilled Steward's Department

Under this method of assignment, a man who worked in both the Skilled Deck and Unskilled Deck categories would be assigned to the Skilled Deck category; a man who worked in both the Unskilled Deck and Unskilled Steward's categories would be assigned to the Unskilled Deck category; and so on. This was done to prevent any man's being counted twice within a single unlicensed union group, in which he might have worked in several different job categories.

Under this method of assignment, a man can be listed in one job category for one union-management group and in a different job category for another union-management group. However, in the union group totals, he is listed only once: in the job category of highest precedence. A man who worked in both a licensed and an unlicensed category is listed in each.

Employment Aboard MSTS Civil Service - Manned Ships

Information on personnel employed aboard MSTS Civil Service-manned ships during calendar 1962 was obtained from MSTS personnel and employment records. The principles followed in assignment to job category are the same as those described above for personnel employed on privately operated ships. It was only necessary, however, to assign MSTS personnel to job categories by Area of employment (Atlantic, Gulf, and Pacific); no union-management groupings were required.

Ranks and Ratings Within Job Categories

The individual ranks and ratings included in each of the job categories used in this report are shown in Table B - 1. (No data are included for Medical or Nuclear personnel.)

TABLE B - 1

JOB CATEGORIES,
SHOWING RANKS AND RATINGS INCLUDED

DECK OFFICERS:

Master
Staff Captain, Exec. Officer
Chief Mate, 1st Officer
2nd Mate, 2nd Officer
Sr. 3rd Mate, Sr. 3rd Officer
3rd Mate, 3rd Officer
Jr. 3rd Mate, Jr. 3rd Officer
Mate & Pilot on Tug or Ferry
Pilot

ENGINEERING OFFICERS:

Chief Engineer
Staff Ch. Engr., Exec. Engr.
1st Asst. Engr.
2nd Asst. Engr.
Sr. 3rd Asst. Engr.
3rd Asst. Engr.
Jr. 3rd Asst. Engr.
Licensed Jr. Asst. Engr.
Licensed Electrician
Licensed Reefer Engr.
Licensed Machinist

RADIO OFFICERS:

Chief Radio Operator
1st Asst. Radio Operator
2nd Asst. Radio Operator
3rd Asst. Radio Operator

STAFF OFFICERS:

Chief Purser
Purser
Sr. Asst. Purser
Jr. Asst. Purser

UNLICENSED PERSONNEL:

DECK DEPARTMENT - SKILLED

AB (Able Bodied Seaman)
QM (Quartermaster)
Bosun, Bosun's Mate
Deck Maintenance

Deck Storekeeper
Carpenter, Carpenter's Mate
Painter, Joiner

TABLE B - 1 (Continued)

DECK DEPARTMENT - UNSKILLED

OS (Ordinary Seaman)	Workaway
Deck Cadet	Unclassified Sailor on Tug
Deck Yeoman	or Ferry
Student Observer: Any Dept.	

ENGINE DEPARTMENT - SKILLED

Electrician	FWT (Fireman - Watertender)
Reefer Engr.	Fireman
Machinist	Oiler
Plumber	Boilermaker
Pumpman	Unlicensed Jr. Engr.
Tankerman	Deck Engr.
Eveporator Maintenance	Watertender

ENGINE DEPARTMENT - UNSKILLED

Wiper	Engine Yeoman
Engine Utility	Coal Passer
Engine Cadet	Winch Driver
Engine Storekeeper	Engine Maintenance

STEWARD'S DEPARTMENT - SKILLED

Administrative:	Food Handlers:
Chief Steward, etc.	All Chefs, Cooks, Bakers,
Steward: Deck, Cabin, etc.	Butchers, Waiters, Waitresses
Stewardess: Deck, Cabin, etc.	

STEWARD'S DEPARTMENT - UNSKILLED

Auditor of Supplies	Bellman
Bartender	Elevator Operator
Pantryman	Attendants: All kinds
Utilityman, Galleyman	Social Director
Silverman	Entertainer
Glassman	Musician
Messman	Dancer
Printer	Public Stenographer
Linotype Operator	Movie Operator
Telephone Operator	Soundman
Locksmith	Fire Patrolman
Upholsterer	Master-at-Arms
Baggage Master	Physical Instructor
Storekeeper	Interpreter
Yeoman	Linenkeeper
Porter	Concessionaire

} { - except in Deck or
Engine Dept.

APPENDIX C

MSTS SHIPBOARD JOBS, MEN EMPLOYED, AND MEN-PER-JOB RATIOS

The numbers of jobs aboard MSTS Civil Service-manned ships are shown by job category and by MSTS Area, as of 30 April 1966, in Table C-1. The same information for 1962 is given in Table C-2. In both tables, subtotals by individual ranks are given for the Deck and Engineering Officer categories.

The MSTS Area abbreviations used in the tables are:

FE	Far East	NORPAC	North Pacific
HON	Honolulu	PAC	Pacific
LANT	Atlantic		

By 1966, HON and NORPAC had been combined with PAC. Hence, for consistency, data on the ships (one each) assigned to HON and NORPAC during 1962 have been combined with the PAC data in Table C-2.

The numbers of men employed during 1962 are shown by job category and by MSTS Area in Table C-3. The last column of the table shows each job category as a percentage of the total men employed.

From the numbers of 1962 jobs (Table C-2) and men employed (Table C-3), the 1962 ratio of men per job is shown for each job category in Table C-4.

The numbers of MSTS Civilian Marine Personnel on board are compared with the ceiling allowances by MSTS Area, as of 30 April 1966, in Table C-5. Ships manned and jobs filled by foreign nationals are included in this table only.

Assuming that all current shortages (Table C-5) occur among U. S. citizen personnel and that the current percentage distribution of these MSTS Civilian Marine Personnel among the 10 job categories is the same as during 1962 (Table C-3), the estimated numbers of on-board MSTS personnel and the ratio of men per job are shown for each job category, as of 30 April 1966, in Table C-6.

All data in these tables whose sources are not otherwise cited are taken from (or computed from data in) Shipboard Manpower.

TABLE C - 1

MSTS SHIPBOARD JOBS
AS OF 30 APRIL 1966^{a/}

Job Category	Number of Shipboard Jobs:				
	LANT (44 Ships) (2)	GULF (5 Ships) (3)	PAC (38 Ships) (4)	FE (11 Ships) (5)	Totals (98 Ships) (6)
(1)					
<u>Deck Officers</u>					
Masters	44	5	38	11	98
Ch. Mates	44	5	38	11	98
2nd Mates	44	5	38	8	95
3rd Mates	95	8	90	8	201
Totals:	227	23	204	38	492
<u>Engineering Officers</u>					
Ch. Engr.	44	5	38	10	97
1/A Engr.	44	5	38	10	97
2/A Engr.	56	6	54	8	124
3/A Engr.	165	17	163	9	354 ^{b/}
Totals:	309	33	293	37	672
<u>Radio Officers</u>	58	5	56	10	129
<u>Staff Officers</u>	63	5	63	12	143
<u>Unlic. Deck Dept.</u>					
Skilled	620	63	602	38	1,323 ^{c/}
Unskilled	145	15	131	15	306
Totals:	765	78	733	53	1,629
<u>Unlic. Engine Dept.</u>					
Skilled	522	56	553	35	1,166
Unskilled	254	56	246	14	530
Totals:	776	112	799	49	1,696
<u>Steward's Dept.</u>					
Skilled	705	20	789	27	1,541
Unskilled	693	44	683	31 ^{d/}	1,451
Totals:	1,398	64	1,472	58	2,992
TOTALS	3,596	320	1,472	257	7,753

(See footnotes, next page.)

TABLE C - 1 (Continued)

- a/ - Source: MSTs manning scales. Foreign nationals are excluded.
- b/ - Includes 156 positions that may be filled by Unlicensed Junior Engineers if Licensed Junior Engineers are not available (LANT, 69; GULF, 9; PAC, 76; FE, 2).
- c/ - Includes 362 positions that may be filled by Ordinary Seamen if AB/Maintenance men are not available (LANT, 190; GULF, 19; PAC, 147; FE, 3).
- d/ - Includes 4 Yeoman - Storekeeper positions that may be filled by either Japanese or American personnel.

TABLE C - 2
MSTS SHIPBOARD JOBS
DURING 1962 ^{a/}

Job Category (1)	Number of Shipboard Jobs:				
	LANT (39 Ships) (2)	GULF (4 Ships) (3)	PAC (24 Ships) ^{b/} (4)	FE (9 Ships) (5)	Totals (76 Ships) (6)
<u>Deck Officers</u>					
Masters	39	4	24	9	76
Ch. Mates	39	4	24	9	76
2nd Mates	39	4	24	6	73
3rd Mates	89	6	57	6	158
Totals:	206	18	129	30	383
<u>Engineering Officers</u>					
Ch. Engr.	39	4	24	8	73
1/A Engr.	39	4	24	8	73
2/A Engr.	50	4	30	6	90
3/A Engr.	148	12	94	7	261 ^{c/}
Totals:	276	24	172	29	501
<u>Radio Officers</u>	55	4	34	8	101
<u>Staff Officers</u>	59	4	40	9	112
<u>Unlic. Deck Dept.</u>					
Skilled	540	52	356	31	979 ^{d/}
Unskilled	139	12	87	9	247
Totals:	679	64	443	40	1,226
<u>Unlic. Engine Dept.</u>					
Skilled	457	44	299	24	824
Unskilled	229	19	147	9	404
Totals:	686	63	446	33	1,228
<u>Steward's Dept.</u>					
Skilled	717	16	463	21	1,217
Unskilled	619	34	374	20	1,047 ^{e/}
Totals:	1,336	50	837	41	2,264
TOTALS	3,297	227	2,101	190	5,815

(See footnotes, next page.)

TABLE C - 2 (Continued)

- a/ - Source: MSTS manning scales. Data exclude foreign nationals.
- b/ - Includes 1 ship each from NORPAC and HON.
- c/ - Includes 111 positions that may be filled by Unlicensed Junior Engineers if Licensed Junior Engineers are not available (LANT, 67; GULF, 6; PAC, 36; FE, 2).
- d/ - Includes 238 positions that may be filled by Ordinary Seamen if AB/Maintenance men are not available (LANT, 147; GULF, 16; PAC, 70; FE, 5).
- e/ - Includes 5 Yeoman - Storekeeper positions that may be filled by either Japanese or American personnel (LANT, 3; FE, 2).

TABLE C - 3

MSTS SHIPBOARD EMPLOYMENT
DURING 1962

Job Category	No. of Men Employed :			Totals ^{a/}	Percent of Total Men Employed ^{b/}
(1)	LANT (2)	GULF (3)	PAC (4)	(5)	(6)
1) Deck Officers	279	34	206	515	6.85%
2) Engineering Officers	467	60	292	807	10.74
3) Radio Officers	62	5	41	106	1.41
4) Staff Officers	75	10	53	135	1.80
Unlic. Deck Dept.					
5) Skilled	644	120	455	1,204	16.02
6) Unskilled	250	30	134	409	5.44
Unlic. Engine Dept.					
7) Skilled	683	122	495	1,277	16.99
8) Unskilled	274	47	197	510	6.78
Steward's Dept.					
9) Skilled	741	31	510	1,278	17.00
10) Unskilled	743	65	482	1,276	16.97
11) TOTALS	---	--	---	7,517	100.00%

^{a/} - The total for each job category is slightly less than the sum of LANT, GULF, and PAC, because a few men received employment from more than one MSTS Area.

^{b/} - Total Men Employed in each job category (Column 5) divided by the overall Total (Column 5, Line 11).

TABLE C - 4
RATIO OF MEN PER JOB
ABOARD MSTs SHIPS DURING 1962

<u>Job Category</u>	<u>No. of Men Employed^{a/}</u>	<u>No. of Jobs^{b/}</u>	<u>Ratio of Men per Job^{c/}</u>
(1)	(2)	(3)	(4)
1) Deck Officers	515	383	1.34
2) Engineering Officers	807	501	1.61
3) Radio Officers	106	101	1.05
4) Staff Officers	135	112	1.21
Unlic. Deck Dept.			
5) Skilled	1,204	979	1.23
6) Unskilled	409	247	1.66
Unlic. Engine Dept.			
7) Skilled	1,277	824	1.55
8) Unskilled	510	404	1.26
Steward's Dept.			
9) Skilled	1,278	1,217	1.05
10) Unskilled	1,276	1,047	1.22
11) TOTALS	7,517	5,815	--

a/ - From Table C-3, column 5.

b/ - From Table C-2, column 6.

c/ - Column 2 divided by column 3.

TABLE C - 5

MSTS CIVILIAN MARINE PERSONNEL
AS OF 30 APRIL 1966^{a/}

MSTS Area	No. of Ships	No. of Jobs	No. of Personnel:		
			Ceiling Allowance	On Board	Short of Allowance
(1)	(2)	(3)	(4)	(5)	(6)
1) LANT	44	3,596	4,073	4,055	18
2) GULF	5	320	338	342	(-) 4
3) PAC	38	1,472	3,988 ^{b/}	3,902 ^{b/}	86 ^{b/}
4) FE	43 ^{c/}	1,641 ^{d/}	2,034	1,968	66
5) TOTALS	130 ^{c/}	9,137 ^{d/}	10,433	10,267	166
6) U. S. Citizens	98 ^{e/}	7,753 ^{f/}	9,071 ^{g/}	8,905 ^{i/}	166 ^{h/}

^{a/} - Data from Marine Wage and Manning Division, MSTS.

^{b/} - Includes Honolulu and Seattle.

^{c/} - Includes 32 LST's manned by foreign nationals under direct hire, not included elsewhere in this report.

^{d/} - Includes 1,384 shipboard jobs filled by foreign nationals under direct hire (19 on AKL 31, 21 on LSM 335, and 42 on each of 32 LST's), not included elsewhere in this report.

^{e/} - 130 (line 5, column 2) minus 32 (note c).

^{f/} - 9,137 (line 5, column 3) minus 1,384 (note d).

^{g/} - 7,753 (line 6, column 3) plus 17% Replacement Reserve.

^{h/} - This figure is intentionally conservative. It assumes that the entire shortage of 166 (line 5, column 6) occurs among U. S. citizen personnel.

^{i/} - 9,071 (line 6, column 4) minus 166 (note h).

TABLE C - 6

ESTIMATED RATIO OF MEN PER JOB
ABOARD MSTs SHIPS
AS OF 30 APRIL 1966

<u>Job Category</u>	<u>Percentage of Total Men Employed, 1962^{a/}</u>	<u>Estimated Personnel on Board, 4/30/66</u>	<u>Shipboard Jobs, 4/30/66^{d/}</u>	<u>Ratio of Men per Job, 4/30/66^{e/}</u>
(1)	(2)	(3)	(4)	(5)
1) Deck Officers	6.85%	610 ^{b/}	492	1.24
2) Engineering Officers	10.74	956 ^{b/}	672	1.42
3) Radio Officers	1.41	126 ^{b/}	129	0.98
4) Staff Officers	1.80	160 ^{b/}	143	1.12
Unlic. Deck Dept.				
5) Skilled	16.02	1,427 ^{b/}	1,323	1.08
6) Unskilled	5.44	484 ^{b/}	306	1.58
Unlic. Engine Dept.				
7) Skilled	16.99	1,513 ^{b/}	1,166	1.30
8) Unskilled	6.78	604 ^{b/}	530	1.14
Steward's Dept.				
9) Skilled	17.00	1,514 ^{b/}	1,541	0.98
10) Unskilled	16.97	1,511 ^{b/}	1,451	1.04
11) TOTALS	100.00%	8,905 ^{c/}	7,753	---

^{a/} - From Table C - 3, column 6.

^{b/} - The number of personnel within each job category is an estimate. It assumes:
(1) that the entire shortage of 166 men occurs among U. S. citizen personnel (See Table C - 5, note h.); and
(2) that the percentage distribution of these 8,905 MSTs Civilian Marine Personnel among the 10 job categories as of 4/30/66 is the same as during 1962.

More precise information on the current distribution of MSTs seagoing personnel among these job categories, to be obtained from the MSTs Areas' personnel files, will be substituted for this table in the Final Report.

^{c/} - From Table C - 5, line 6, column 5.

^{d/} - From Table C - 1, column 6.

^{e/} - Column 3 divided by column 4. Note the assumptions made (note b) in computing column 3, lines 1 through 10.

APPENDIX D

SHIPBOARD JOBS, MEN EMPLOYED, AND MEN-PER-JOB RATIOS FOR PRIVATELY OPERATED SHIPS

The numbers of jobs aboard privately operated ships of 1,000 gross tons or more are shown by job category and general ship type, as of 1 April 1966, in Table D-1. The same information, as of 1 October 1961, is given in Table D-2. Both tables are compiled from typical manning scale data for the ships listed in the Maritime Administration (MarAd) tabulations described in Appendix A. Both exclude Medical, Nuclear, and Cadet jobs; both include Concessionaire jobs.

The numbers of men employed and jobs aboard privately operated ships during the Study Year, 1 April 1962 - 31 March 1963, are shown in Table D-3 by job category and union group. The data, taken from Shipboard Manpower, include all men who sailed under articles during the Study Year except those who worked solely on vessels that rarely sailed under articles. (These men were excluded because information on their employment was incomplete and because it was virtually impossible to identify the union affiliation of these small vessels without contacting their owners individually.)

The union group abbreviations used in the tables are:

ARA	- American Radio Assoc., AFL-CIO*
BMO	- Brotherhood of Marine Officers, AFL-CIO*
MEBA	- National Marine Engineers' Beneficial Assoc., AFL-CIO*
MMP	- Intl. Organization of Masters, Mates & Pilots, AFL-CIO*
MSO	- Marine Staff Officers' Union, AFL-CIO*
NMU	- National Maritime Union of America, AFL-CIO*
ROU	- Radio Officers' Union of the Commercial Telegraphers Union, AFL-CIO*
SIU	- Seafarers International Union of North America, AFL-CIO*
SOA	- Staff Officers' Assoc. of America, AFL-CIO*
Unaffil.	- unions unaffiliated with any of the above groups*
WSAM	- men working solely as Masters during the Study Year (These men are not included in any of the above groups.)

* - All men except "WSAM" who sailed on Great Lakes ships are included in the "Gt. Lakes" category, regardless of their union affiliation, and are not included in any of the above.

The number of men employed, the number of jobs, and the ratio of men per job during the Study Year are derived for privately operated oceangoing ships, as shown in Table D-4, for each job category. Tables D-4 through D-6 exclude Great Lakes ships.

The estimated numbers of jobs aboard privately operated ocean-going ships are shown by job category, as of 1 April 1966, in Table D-5.

The projected numbers of men available for privately operated oceangoing ships are shown by job category in Table D-6, as of 30 June 1966. These figures were computed from the numbers of men who sailed during the Study Year (Table D-4) and the attrition projections contained in Appendix E.

In all six tables, data on the numbers of jobs and men employed include Concessionaires (in the Unskilled Steward's Department category) and exclude the Medical and Nuclear categories. Cadets are excluded from the MarAd tabulations (Tables D-1 and D-2, and columns 3 and 5 of Table D-5), but are included (in the Unskilled Deck and Unskilled Engine Department categories) in the other tabulations.

All data in these tables whose sources are not otherwise cited are taken from (or computed from data in) Shipboard Manpower.

TABLE D - 1

JOBS ABOARD PRIVATELY OPERATED SHIPS
OF 1,000 GROSS TONS OR MORE
AS OF APRIL 1, 1966 ^{a/}

Job Category	No. of Shipboard Jobs: ^{b/}				
	Passenger and Combination (27 Ships)	Dry Cargo, except (4) (694 Ships)	Refrig. (18 Ships)	Tanker (261 Ships)	Total Fleet (1,000 Ships)
(1)	(2)	(3)	(4)	(5)	(6)
<u>Deck Officers</u>					
Masters	27	694	18	261	1,000
Ch. Mates	<u>c/</u>	694	18	259	---
2nd Mates	<u>c/</u>	694	18	261	---
3rd Mates	<u>c/</u>	1,342	20	435	---
Totals:	<u>182</u>	<u>3,424</u>	<u>74</u>	<u>1,216</u>	<u>4,896</u>
<u>Engineering Officers</u>					
Ch. Engr.	27	694	18	261	1,000
1/A Engr.	<u>c/</u>	695	18	261	---
2/A Engr.	<u>c/</u>	699	18	261	---
3/A Engr.	<u>c/</u>	2,078	31	509	---
Totals:	<u>306</u>	<u>4,166</u>	<u>85</u>	<u>1,292</u>	<u>5,849</u>
<u>Radio Officers</u>	104	692	18	259	1,073
<u>Staff Officers</u>	194	441	18	3	656
<u>Unlic. Deck Dept.</u>					
Skilled	598	6,670	177	2,271	9,716
Unskilled	<u>186</u>	<u>2,073</u>	<u>54</u>	<u>781</u>	<u>3,094</u>
Totals:	<u>784</u>	<u>8,743</u>	<u>231</u>	<u>3,052</u>	<u>12,810</u>
<u>Unlic. Engine Dept.</u>					
Skilled	547	5,723	224	2,074	8,568
Unskilled	<u>251</u>	<u>1,950</u>	<u>47</u>	<u>774</u>	<u>3,022</u>
Totals:	<u>798</u>	<u>7,673</u>	<u>271</u>	<u>2,848</u>	<u>11,590</u>
<u>Steward's Dept.</u>					
Skilled	2,576	2,665	72	776	6,089
Unskilled	<u>2,450 ^{d/}</u>	<u>3,754</u>	<u>142</u>	<u>1,416</u>	<u>7,762 ^{d/}</u>
Totals:	<u>5,026 ^{d/}</u>	<u>6,419</u>	<u>214</u>	<u>2,192</u>	<u>13,851 ^{d/}</u>
TOTALS:	<u>7,394 ^{d/}</u>	<u>31,558</u>	<u>911</u>	<u>10,862</u>	<u>50,725 ^{d/}</u>

(See footnotes, next page) --

TABLE D - 1 (continued)

- a/ Estimates are based on manning scale data for each ship type shown in Table A-1, obtained from Division of Labor Studies, Office of Maritime Manpower, Maritime Administration, U. S. Department of Commerce.
- b/ The data exclude 78 Medical jobs aboard Passenger and Combination ships, the Medical and Nuclear jobs aboard the NS SAVANNAH, and Cadet jobs on all ships where carried.
- c/ This data, available from Coast Guard files, will be included in the Final Report.
- d/ Includes 276 Concessionaire jobs.

TABLE D - 2

JOBS ABOARD PRIVATELY OPERATED SHIPS
OF 1,000 GROSS TONS OR MORE
AS OF OCTOBER 1, 1961

Job Category	No. of Shipboard Jobs: ^{b/}				
	Passenger and Combination (31 Ships)	Dry Cargo except (4) (587 Ships)	Refrig. (20 Ships)	Tanker (285 Ships)	Total Fleet (923 Ships)
(1)	(2)	(3)	(4)	(5)	(6)
<u>Deck Officers</u> ^{a/}					
Masters	31	587	20	285	923
Ch. Mates	<u>c/</u>	587	20	282	---
2nd Mates	<u>c/</u>	587	20	285	---
3rd Mates	<u>c/</u>	1,077	22	337	---
Totals:	<u>205</u>	<u>2,838</u>	<u>82</u>	<u>1,189</u>	<u>4,314</u>
<u>Engineering Officers</u> ^{a/}					
Ch. Engr.	31	587	20	285	923
1/A Engr.	<u>c/</u>	587	20	285	---
2/A Engr.	<u>c/</u>	587	20	285	---
3/A Engr.	<u>c/</u>	1,712	37	559	---
Totals:	<u>342</u>	<u>3,473</u>	<u>97</u>	<u>1,414</u>	<u>5,326</u>
<u>Radio Officers</u> ^{a/}	119	587	20	282	1,008
<u>Staff Officers</u> ^{a/}	221	239	20	15	495
<u>Unlic. Deck Dept.</u>					
Skilled	732	5,518	194	2,712	9,156
Unskilled	228	1,714	59	932	2,933
Totals: ^{d/}	<u>960</u>	<u>7,232</u>	<u>253</u>	<u>3,644</u>	<u>12,089</u>
<u>Unlic. Engine Dept.</u>					
Skilled	607	4,681	244	2,287	7,819
Unskilled	278	1,594	51	853	2,776
Totals: ^{d/}	<u>885</u>	<u>6,275</u>	<u>295</u>	<u>3,140</u>	<u>10,595</u>
<u>Steward's Dept.</u>					
Skilled	2,797	2,435	80	812	6,124
Unskilled	<u>2,687 ^{e/}</u>	<u>3,429</u>	<u>158</u>	<u>1,481</u>	<u>7,755 ^{e/}</u>
Totals: ^{d/}	<u>5,484 ^{e/}</u>	<u>5,864</u>	<u>238</u>	<u>2,293</u>	<u>13,879 ^{e/}</u>
TOTALS:	8,216 ^{e/}	26,508	1,005	11,977	47,706 ^{e/}

(See footnotes, next page.)--

TABLE D - 2 (Continued)

- a/ - Source: Division of Labor Data, Office of Ship Statistics, Maritime Administration, U. S. Department of Commerce, Estimate of Civilian Seafaring Job Potential by Collective Bargaining Groups, U. S. Flag Oceangoing Ships of 1,000 Gross Tons and Over, as of October 1, 1961, Nov. 20, 1961.
The breakdown of Deck and Engineering Officer ratings, not included in the source cited, is based on manning scale data for each ship type, obtained from the Division of Labor Studies, Office of Maritime Manpower, Maritime Administration, U. S. Department of Commerce.
- b/ - The data exclude Medical jobs aboard Passenger and Combination ships, and Cadet jobs on all ships where carried.
- c/ - This data, available from Coast Guard files, will be included in the Final Report.
- d/ - Total jobs for Unlicensed Deck Department, Unlicensed Engine Department, and Steward's Department were computed from manning scale data (as of January 1, 1961) from Division of Labor Data, Office of Ship Statistics, Maritime Administration, U. S. Department of Commerce, Active U. S. Flag Merchant Ships of 1,000 Gross Tons or Over Operating in the Foreign and Domestic Trades -- as of January 1st for the Calendar Years Shown, March 9, 1961.
The breakdown of each of these totals assumes that the ratio between Skilled and Unskilled jobs (excluding Concessionaire jobs) was the same on October 1, 1961 as on April 1, 1961 (Table D - 1). The number of Concessionaire jobs, which was also computed from the above-cited manning scale data, was added on after the calculation of the number of Unskilled Steward's Department jobs.
- e/ - Includes 326 Concessionaire jobs.

TABLE D - 3

EMPLOYMENT ABOARD PRIVATELY OPERATED SHIPS,
1 APRIL 1962 - 31 MARCH 1963

<u>Job Category</u>	<u>Union Group</u> ^{a/}	<u>No. of Men Employed</u>	<u>No. of Jobs</u>
(1)	(2)	(3)	(4)
1) Deck Officers	WSAM ^{b/}	1,602 ^{b/}	1,360 ^{b/}
	BMO	361	198
	MMP	5,743	3,196
	Unaffil.	1,333	646
	Gt. Lakes ^{c/}	992	779
Totals		9,796 ^{d/}	6,179
2) Engineering Officers	BMO	619	323
	MEBA	8,465	4,811
	Unaffil.	1,574	828
	Gt. Lakes	1,332	1,139
Totals		11,474 ^{d/}	7,101
3) Radio Officers	ARA	1,019	612
	ROU	658	425
	Unaffil.	201	108
	Gt. Lakes	10	5
Totals		1,784 ^{d/}	1,150

(continued --)

a/ - Union Group abbreviations are explained at the beginning of Appendix D.

b/ - Of the 1,602 men who worked solely as Masters ("WSAM"), more than two-thirds are MMP members. The exact distribution of union affiliations could not be determined from available data because Masters are not covered by Discharges and, in many cases, are not required to be union members. The number of Masters' jobs is assumed equal to the number of privately operated ships sailing under articles and employing Deck Officers during the Study Year.

c/ - A substantial but undetermined number of these 992 men are MMP members.

d/ - The Total Number of Men Employed in each Job Category is less than the sum of the Union Group totals within that category because some men worked in more than one Union Group.

TABLE D - 3 (continued)

<u>Job Category</u>	<u>Union Group^{a/}</u>	<u>No. of Men Employed</u>	<u>No. of Jobs</u>
(1)	(2)	(3)	(4)
4) Staff Officers	SOA	459	291
	MSO	272	184
	Unaffil.	112	58
	Gt. Lakes	58	37
Totals		888 ^{d/}	570
Unlic. Deck Dept.:			
5) Skilled	NMU	8,465	4,466
	SIU	7,887	4,330
	Unaffil.	1,839	1,035
	Gt. Lakes	3,517	2,173
Totals		20,352 ^{d/}	12,004
6) Unskilled ^{e/}	NMU	3,765	2,168
	SIU	2,873	1,227
	Unaffil.	720	308
	Gt. Lakes	855	655
Totals		7,608 ^{d/}	4,358
Unlic. Engine Dept.:			
7) Skilled	NMU	8,073	4,558
	SIU	6,756	3,879
	Unaffil.	1,417	792
	Gt. Lakes	2,229	1,562
Totals		17,211 ^{d/}	10,791
8) Unskilled ^{e/}	NMU	2,997	1,683
	SIU	2,226	937
	Unaffil.	381	146
	Gt. Lakes	850	655
Totals		5,720 ^{d/}	3,421
Steward's Dept.:			
9) Skilled	NMU	7,105	3,846
	SIU	4,832	2,938
	Unaffil.	634	360
	Gt. Lakes	1,118	777
Totals		13,481 ^{d/}	7,921

^{e/} Includes Cadets aboard ships where carried.

(continued)--

TABLE D - 3 (continued)

<u>Job Category</u>	<u>Union Group^{a/}</u>	<u>No. of Men Employed</u>	<u>No. of Jobs</u>
(1)	(2)	(3)	(4)
10) Unskilled ^{f/}	NMU	7,898	4,808
	SIU	5,495	2,641
	Unaffil.	822	346
	Gt. Lakes	1,281	1,285
Totals		13,998 ^{d/}	9,080
TOTALS:		102,310	62,575

^{f/} Includes Concessionaires aboard Passenger and Combination ships.

TABLE D - 4
RATIO OF MEN PER JOB
ABOARD PRIVATELY OPERATED OCEANGOING SHIPS,
1 APRIL 1962 - 31 MARCH 1963

<u>Job Category</u>	<u>No. of Men Employed</u>	<u>Adjusted No. of Jobs^{b/}</u>	<u>Ratio of Men per Job^{c/}</u>
(1)	(2)	(3)	(4)
1) Deck Officers	9,021 ^{d/}	5,899	1.53
2) Engineering Officers	10,766 ^{d/}	6,512	1.65
3) Radio Officers	1,774 ^{a/}	1,251	1.42
4) Staff Officers	830 ^{a/}	582	1.43
Unlic. Deck Dept.			
5) Skilled	16,835 ^{a/}	10,739	1.57
6) Unskilled	6,753 ^{a/}	4,044	1.67
Unlic. Engine Dept.			
7) Skilled	14,982 ^{a/}	10,081	1.49
8) Unskilled	4,870 ^{a/}	3,021	1.61
Steward's Dept.			
9) Skilled	12,363 ^{a/}	7,804	1.58
10) Unskilled	12,717 ^{a/}	8,515	1.49
11) TOTALS	90,070	58,448	---

(See footnotes, next page.)--

TABLE D - 4 (continued)

a/ - Computed by deducting "Great Lakes" men from Table D-3, column 3.

b/ - Computed as follows:

- (1) "Great Lakes" jobs were deducted from Table D-3, column 4, yielding the unadjusted number of oceangoing jobs.
- (2) A total of 4,941 jobs (based on an average of 4.5 jobs per ship) were added, to compensate for the probable underestimate of the numbers of jobs caused by the rounding procedure in the computer program. This total was apportioned among the 10 job categories in proportion to their relative sizes after step (1).
- (3) The results of steps (1) and (2) were added, yielding the "Adjusted Number of Jobs" for each category.

c/ - Column 2 divided by column 3.

d/ - The Shipboard Manpower data show that 9,021 men holding Unlimited (tonnage) - Any Oceans licenses sailed as Deck Officers during the Study Year aboard privately operated ships other than Great Lakes ships, while an additional 511 men holding such licenses sailed only in jobs outside the Licensed Deck Officer category; and that 10,766 men holding Unlimited (horsepower) Steam licenses sailed as Engineering Officers during the Study Year aboard privately operated ships other than Great Lakes ships, while an additional 470 men holding such licenses sailed only in jobs outside the Licensed Engineering Officer category.

TABLE D - 5
ESTIMATED JOBS
ABOARD PRIVATELY OPERATED OCEANGOING SHIPS
AS OF APRIL 1, 1966^{a/}

<u>Job Category</u>	<u>No. of Jobs Aboard:</u>				
	<u>All Oceangoing Ships, Study Year^{b/}</u>	<u>MarAd- Listed Ships, 10/1/61^{c/}</u>	<u>Other Oceangoing Ships, Study Year^{d/}</u>	<u>MarAd- Listed Ships 4/1/66^{e/}</u>	<u>All Oceangoing Ships, ^{f/} 4/1/66^{-/}</u>
(1)	(2)	(3)	(4)	(5)	(6)
1) Deck Officers	5,899	4,314	1,585	4,896	6,481
2) Engineering Officers	6,512	5,326	1,186	5,849	7,035
3) Radio Officers	1,251	1,008	243	1,073	1,316
4) Staff Officers	582	495	87	656	743
<u>Unlic. Deck Dept.</u>					
5) Skilled	10,739	9,156	1,583	9,716	11,299
6) Unskilled	4,044	2,933	1,111	3,094	4,205
Totals:	14,783	12,089	2,694	12,810	15,504
<u>Unlic. Engine Dept.</u>					
7) Skilled	10,081	7,819	2,262	8,568	10,830
8) Unskilled	3,021	2,776	245	3,022	3,267
Totals:	13,102	10,595	2,507	11,590	14,097
<u>Steward's Dept.</u>					
9) Skilled	7,804	6,124	1,680	6,089	7,769
10) Unskilled	8,515	7,755	760	7,762	8,522
Totals:	16,319	13,879	2,440	13,851	16,291
11) TOTALS:	58,448	47,706	10,742	50,449	61,467

(See footnotes, next page)--

TABLE D - 5 (continued)

-
- a/ The data:
- (1) exclude jobs aboard Great Lakes ships. (The numbers of ships so excluded are shown in Table A-2, column 3.)
 - (2) exclude Medical jobs aboard Passenger and Combination ships.
 - (3) exclude Medical and Nuclear jobs aboard the NS SAVANNAH.
 - (4) include Concessionaire jobs aboard Passenger and Combination ships.
 - (5) include Cadet jobs aboard ships where carried in columns 2, 4, and 6 only. (These jobs are not included in the Maritime Administration data from which columns 3 and 5 were computed.)
- b/ From Table D-4, column 3.
- c/ From Table D-2, column 6.
- d/ Column 2 less column 3.
- e/ From Table D-1, column 6.
- f/ Column 4 plus column 5. These figures assume that, for the MarAd-listed fleet, the total number of jobs in each rating category was the same during the Study Year (1 April 1962 - 31 March 1963) as it was on 1 October 1961 (the closest date to the Study Year for which published Maritime Administration data of this type are available). The error introduced by this assumption is believed to be small.

Ship-by-ship manning scale data can be obtained from the Coast Guard files of Shipping Articles. This will provide a more accurate count of the jobs in each category. These data also will permit the inclusion in the Final Report of a breakdown of current jobs by individual rank and rating and by union-management group.

TABLE D-6

MANPOWER AVAILABILITY PROJECTION
FOR PRIVATELY OPERATED OCEANGOING SHIPS
AS OF 30 JUNE 1966^{a/}

Job Category	No. of Men Employed during Study Year ^{b/}	Projected 6/30/66 Work Force Size:		Projected Net Attrition of Work Force, 12/31/62-6/30/66:	
		As a Percentage of 12/31/62 Work Force Size ^{c/}	No. of Men ^{d/}	Net Decrease over 3 1/2 Yr. ^{e/}	Avg. Annual Net Rate ^{f/}
(1)	(2)	(3)	(4)	(5)	(6)
Deck Officers	9,021	75.8%	6,838	24.2%	6.9%
Engineering Officers	10,766	80.0	8,613	20.0	5.7
Radio Officers	1,774	77.9	1,382	22.1	6.3
Staff Officers	830	73.0	606	27.0	7.7
UNLICENSED:					
Deck Dept., Skilled	16,835	77.9	13,114	22.1	6.3
Deck Dept., Unskilled	6,753	77.9	5,261	22.1	6.3
Engine Dept., Skilled	14,982	79.0	11,836	21.0	6.0
Engine Dept., Unskilled	4,870	79.0	3,847	21.0	6.0
Steward's Dept., Skilled	12,363	79.0	9,767	21.0	6.0
Steward's Dept., Unskilled	12,717	79.0	10,046	21.0	6.0
TOTALS	90,911	----	71,310	----	---

(See footnotes, next page.)

TABLE D-6 (Continued)

a/ - Based upon Shipboard Manpower projections, described in Appendix E.

b/ - From Table D-4, column 2.

c/ - From Figures E-1, E-2, and E-3.

Because the data did not permit separate projections for the Skilled and Unskilled categories of Unlicensed Deck or Engine Department personnel, the overall attrition rate for each department was assumed applicable to both Skilled and Unskilled personnel.

Projection data for the Steward's Department was not available; based on similarities in the pattern of the Shipboard Manpower distributions of age and average days employed under articles, it was decided that the attrition rate for Unlicensed Engine Department personnel would best approximate the rate for Steward's Department personnel.

d/ - Column 2 multiplied by percentage shown in column 3.

e/ - 100% minus column 3.

f/ - This is the average annual straight-line net attrition rate: column 5 divided by 3 1/2 years.

APPENDIX E

ATTRITION OF THE SEAGOING WORK FORCE MANNING PRIVATELY OPERATED SHIPS

From the data in Shipboard Manpower, we know that the overlap between MSTs Civilian Marine Personnel and the seagoing personnel manning the privately operated ships was negligible during the Study Year, 1 April 1962 - 31 March 1963. It is assumed that this is still true. On this basis, the two work forces can be examined as substantially separate sources of available manpower.

While data on the current MSTs seagoing work force are available, there is no central source of information from which to determine the size of the active work force available to man privately operated ships. Hence, the estimate for this segment of the work force had to be derived from data on the number of men who are known to have worked during some previous period, adjusted for net change in work force size during the intervening period.

Projections of net attrition for Deck and Engineering Officers, Radio and Staff Officers, and Unlicensed Deck and Engine Department personnel are shown in Figures E-1, E-2, and E-3, respectively. These are taken directly from Shipboard Manpower.^{*} The data in that report on Unlicensed personnel did not permit separate projections for the Skilled and Unskilled categories in the Deck, Engine, and Steward's Departments. No projection was made for the Steward's Department; because of the miscellaneous nature of the Unskilled ratings included (shown in the last section of Table B-1), it was believed that attrition figures such as those developed for other categories would not be meaningful for the Steward's Department.

In figures E-1 through E-3, the solid portion of each curve connects the points which represent the trend of observed net attrition. The broken segments of each curve show the trend of a 10-year projection of work force size. (It should be noted that the point corresponding to any given year refers to work force size at the end of that year.)

For each job category, the (projected) current work force size and the average straight-line annual net attrition rate to date (assuming that the curves are straight lines, which they approximate over the 1962-1966 range) are shown as percentages of the 1962 year-end work force size in Table E-1.

* Op. cit., Figure 2, p. 18; Figure 13, p. 58; Figure 23, p. 69; Figure 33, p. 79; Figure 49, p. 89; Figure 57, p. 94.

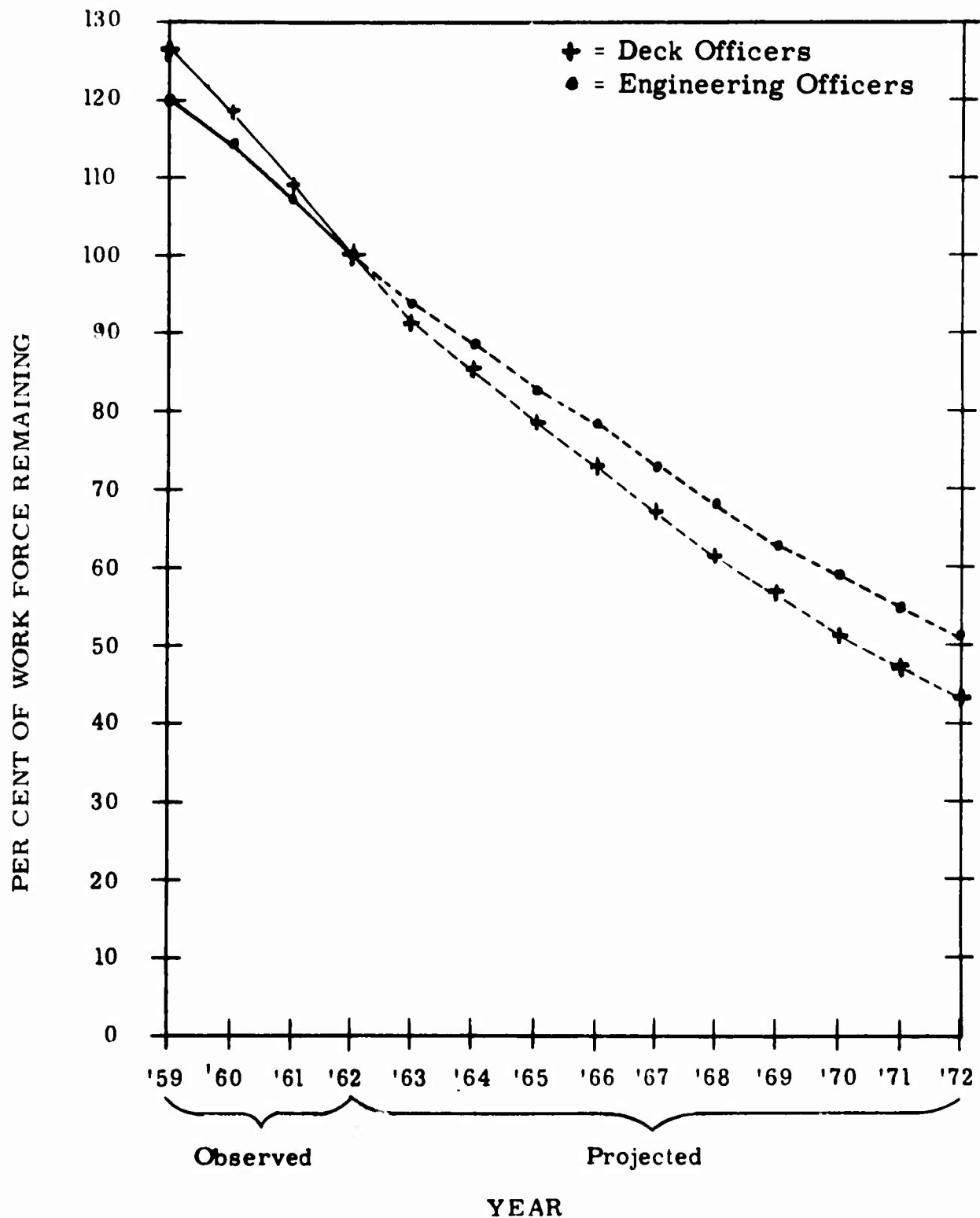
The projections assume that the average annual net attrition rates for 1959-1962 remain constant over the subsequent 10-year period. Since this would imply the continuation of substantially the same work opportunity, employment conditions and pension benefits, average work force age relative to the usual retirement age, and so forth, these projections are, to some unknown extent, inaccurate.

To develop the data necessary for Shipboard Manpower, a key-punch group was set up to process the Coast Guard records (discharges, license files, and biographical information from records jackets). Since completion of its work on the data covering the Study Year, this group has continued as a Maritime Administration program. From the data covering subsequent periods, attrition information can be developed by direct comparison of each year's work force size with that of the preceding year, rather than by projection. This information is on tapes, available for use, and the computer programs necessary to process the data are being written by the staff of the Maritime Transportation Research Board. The resulting attrition information will be included in the Final Report and will permit a more accurate estimate of the seagoing manpower available to meet current and future manning requirements.

FIGURE E - 1

NET ATTRITION OF SEAGOING WORK FORCE:
DECK AND ENGINEERING OFFICERS
ABOARD PRIVATELY OPERATED SHIPS*

Base Year = 1962



* Excludes men sailing solely as Masters and men who worked solely as Port Relief Officers and Port Relief Engineers.

FIGURE E - 2

NET ATTRITION OF SEAGOING WORK FORCE:
RADIO AND STAFF OFFICERS
ABOARD PRIVATELY OPERATED SHIPS

Base Year = 1962

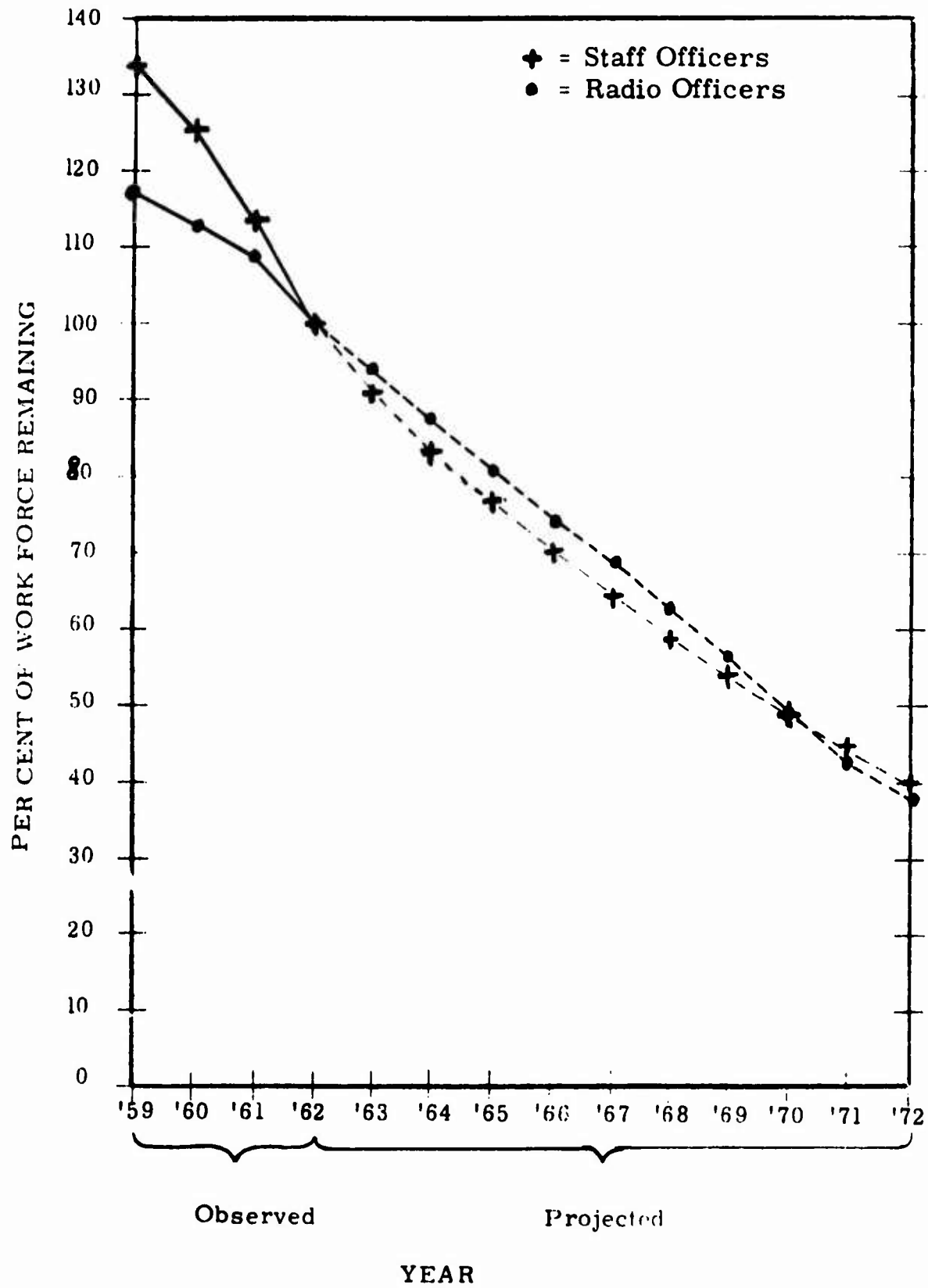


FIGURE E - 3

NET ATTRITION OF SEAGOING WORK FORCE:
UNLICENSED DECK AND ENGINE DEPARTMENTS
ABOARD PRIVATELY OPERATED SHIPS

Base Year = 1962

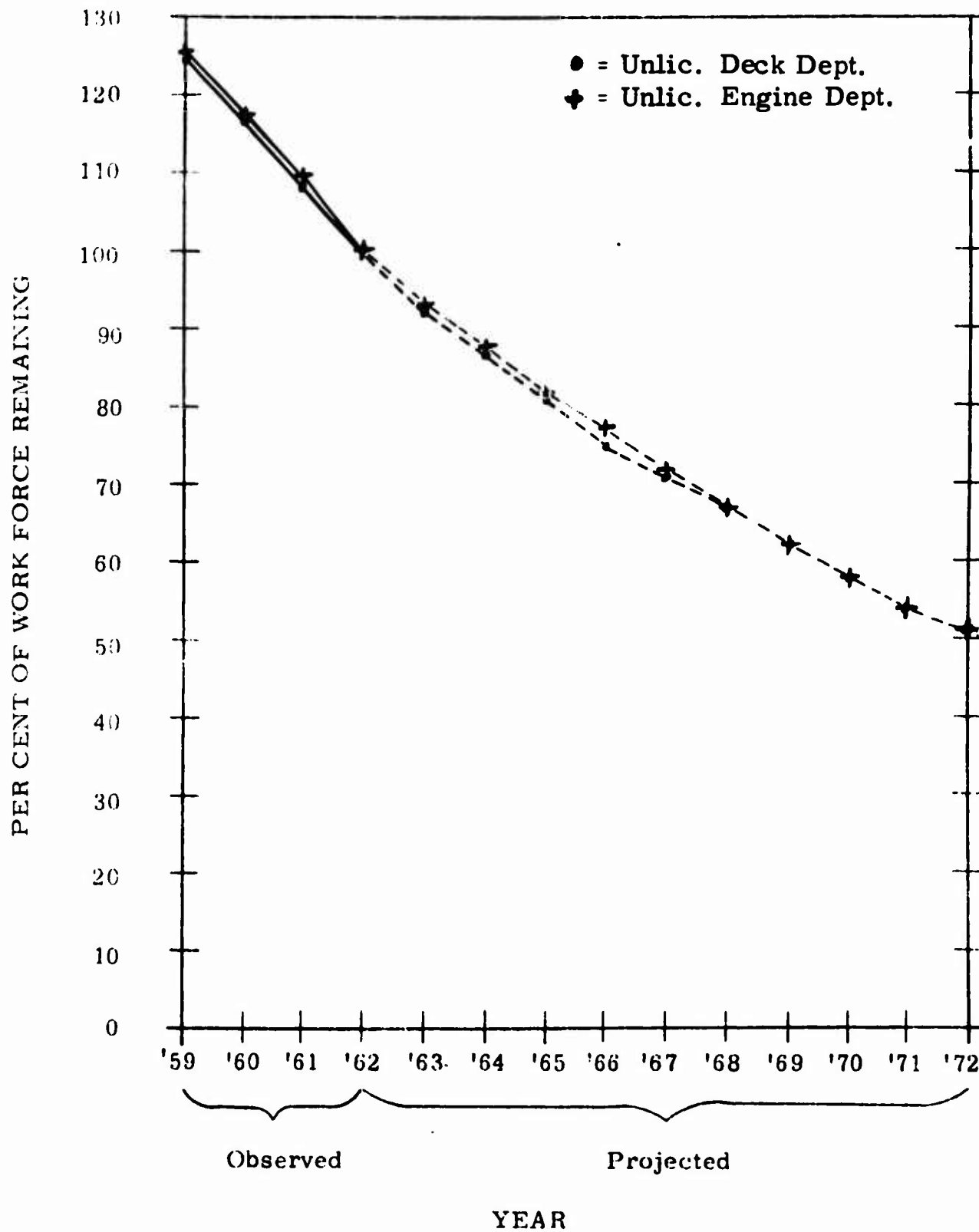


TABLE E-1

NET ATTRITION OF SEAGOING PERSONNEL
MANNING PRIVATELY OPERATED SHIPS,
31 DECEMBER 1962 - 30 JUNE 1966

Job Category	6/30/66 Work Force Size as a Percentage of the 12/31/62 Work Force Size ^{a/}	Average Straight-Line Annual Net Attrition Rate, 12/31/62 - 6/30/66, ^{b/}
(1)	(2)	(3)
1) Deck Officers	75.8%	6.9%
2) Engineering Officers	80.0	5.7
3) Radio Officers	77.9	6.3
4) Staff Officers	73.0	7.7
5) Unlic. Deck Dept.	77.9	6.3
6) Unlic. Engine Dept.	79.0	6.0

^{a/} - From Figures E-1, E-2, and E-3.

^{b/} - 100% minus column 2, divided by 3 1/2 years.

APPENDIX F

MANPOWER REQUIREMENT ESTIMATES FOR PRIVATELY OPERATED OCEANGOING SHIPS

Given the estimated number of shipboard jobs to be filled, by job category, aboard privately operated oceangoing ships, the manpower requirements can be estimated in two ways. The indirect approach, followed in Appendix D, is to compute the ratio of men per job, by category, for a previous period and apply that ratio to the current number of jobs. The direct approach, used in this appendix, takes the current number of jobs as a base; adds allowances for vacations, port relief, and hospitalization; and arrives at a minimum manpower requirement.

The Shipboard Manpower data show that the supply of seagoing men exceeded demand in every job category during the Study Year, 1 April 1962 - 31 March 1963. This means that applying the Study Year men-per-job ratios to the current numbers of jobs (as was done in Appendix D) yields estimates which exceed the minimum numbers of men required to man the present-day fleet. Thus, for each job category, the estimate presented below can be used in combination with that of Appendix D to define a manpower requirement range, within which the exact requirement should lie.

The estimated minimum numbers of men required and of men per job are shown in Table F-1 for privately operated oceangoing ships. The figures include allowances for vacations, port relief, and hospitalization. These allowances were computed as shown in Tables F-2 and F-3.

TABLE F - 1
MANPOWER REQUIREMENT ESTIMATES
(INCLUDING VACATIONS, PORT RELIEF, AND HOSPITALIZATION)
FOR PRIVATELY OPERATED OCEANGOING SHIPS
AS OF 1 APRIL 1966

Job Category	No. of Jobs, 4/1/66 ^{a/}	Allowance for:			Minimum No. of Men Required, 4/1/66 ^{d/}	Minimum Men-per-Job Ratio ^{e/}
		Vacations ^{b/}	Port Relief ^{c/}	Hospital- ization ^{c/}		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Deck Officers	6,481	1,482	879	192	9,034	1.39
Engineering Officers	7,035	1,668	881	242	9,826	1.40
Radio Officers	1,316	335	---	39	1,690	1.28
Staff Officers	743	81	---	17	841	1.13
UNLICENSED:						
Deck Dept., Skilled	11,299	1,234	---	368	12,901	1.14
Deck Dept., Unskilled	4,205	348	---	148	4,701	1.12
Engine Dept., Skilled	10,830	1,145	---	332	12,307	1.14
Engine Dept., Unskilled	3,267	261	---	108	3,636	1.11
Steward's Dept., Skilled	7,769	821	---	274	8,864	1.14
Steward's Dept., Unskilled	8,522	755	---	282	9,559	1.12
TOTALS	61,467	8,130	1,760	2,002	73,359	----
						(See footnotes, next page)

TABLE F - 1 (Continued)

a/ - From Table D-5, column 6.

b/ - From Table F-2.

c/ - From Table F-3.

d/ - Total of columns 2, 3, 4, and 5.

e/ - Column 6 divided by column 2.

TABLE F - 2
VACATION ALLOWANCE ESTIMATES
FOR PRIVATELY OPERATED OCEANGOING SHIPS
AS OF 1 APRIL 1966

Job Category	Avg. No. of Days Worked during Study Year ^{a/}	Vacation accrued ^{b/}			Vacation Allowance (No. of Men) ^{d/}
		during Days Worked	during Vacation	Total ^{c/}	
(1)	(2)	(3)	(4)	(5)	(6)
Deck Officers	179	60	20	80	1,482
Engineering Officers	188	62	21	83	1,668
Radio Officers	202	67	22	89	335
Staff Officers	198	33	5	38	81
UNLICENSED:					
Deck Dept., Skilled	186	31	5	36	1,234
Deck Dept., Unskilled	148	25	4	29	348
Engine Dept., Skilled	192	32	5	37	1,145
Engine Dept., Unskilled	144	24	4	28	261
Steward's Dept., Skilled	192	32	5	37	821
Steward's Dept., Unskilled	160	27	4	31	755
TOTAL	---	--	--	--	8,130

(See footnotes, next page)

TABLE F - 2 (Continued)

- a/ - From Shipboard Manpower. Study Year = 1 April 1962 - 31 March 1963.
- b/ - Vacation is accrued at the rate of 10 days per 30 days of paid employment for Deck, Engineering, and Radio Officers, and at the rate of 5 days per 30 days of paid employment for the other job categories. Since vacation time, itself, qualifies as paid employment, vacation time is accrued during the time a man is on vacation (as shown in column 4).
- c/ - Column 3 plus column 4.
- d/ - Column 5 divided by 350, multiplied by the number of jobs (from Table D-5, column 6). This figure is the average number of men on vacation; it is taken as the number of additional men needed to meet vacation requirements.

TABLE F - 3

PORT RELIEF AND HOSPITALIZATION
ALLOWANCE ESTIMATES
FOR PRIVATELY OPERATED OCEANGOING SHIPS
AS OF 1 APRIL 1966

Job Category	No. of Ships	Port Relief Allowance (No. of Men) ^{b/}	Projected No. of Men as of 6/30/66 ^{c/}	Hospitalization Allowance (No. of Men) ^{d/}
(1)	(2)	(3)	(4)	(5)
Deck Officers	1,172 ^{a/}	879	6,838	192
Engineering Officers	1,175 ^{a/}	881	8,613	242
Radio Officers	-----	---	1,382	39
Staff Officers	-----	---	606	17
UNLICENSED:				
Deck Dept., Skilled	-----	---	13,114	368
Deck Dept., Unskilled	-----	---	5,261	148
Engine Dept., Skilled	-----	---	11,836	332
Engine Dept., Unskilled	-----	---	3,847	108
Steward's Dept., Skilled	-----	---	9,767	274
Steward's Dept., Unskilled	-----	---	10,046	282
TOTALS	-----	1,760	71,310	2,002

(See footnotes, next page)

a/

b/

c/

d/

TABLE F - 3 (Continued)

- a/ - Includes the 1,000 ships in the Maritime fleet tabulation (Table A-1). The remainder are ships which the Shipboard Manpower data showed as operating regularly under articles during the Study Year (excluding Great Lakes ships) and employing Deck and Engineering Officers.
- b/ - Three Port Relief (Deck) Officers and three Port Relief Engineers are required per ship when it is in a U. S. port on a week-end or holiday. (This is the peak daily requirement per ship; only two of each are required on a week-day.) It is assumed that, on the average, half the ships are in port each day and that half of these (a fourth of the total) are in U. S. ports. The number of men required to meet the peak requirement for either officer category is computed as 1/4 the number of ships, multiplied by 3 men per ship.
- c/ - From Table D-6, column 4.
- d/ - Labor-Management Maritime Committee, A Review of Current Problems Affecting Hospital and Medical Care of Merchant Seamen, Washington, August 10, 1961, p. E gives the average daily patient load in Public Health Service hospitals as slightly above 2,000 during 1960 (the most recent year for which data are included in the report). This number has been pro-rated among the job categories in proportion to projected work force size (column 4).

NONE

Security Classification

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13. ABSTRACT This report contains the best estimates of the requirements for and availability of seagoing personnel to man the current U.S.-flag oceangoing merchant marine.that could be developed from recent studies and other available information. Data are presented separately for the MSTs Civil Service-manned fleet and for privately operated oceangoing ships. Great Lakes ships are excluded.			

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